BOOTSTRAP CONFIDENCE INTERVALS FOR A POPULATION MEAN OF CRACK DISTRIBUTION

BY

MISS PREYA PICHETVERACHAI

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE (APPLIED STATISTICS)
DEPARTMENT OF MATHEMATICS AND STATISTICS
FACULTY OF SCIENCE AND TECHNOLOGY
THAMMASAT UNIVERSITY
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ENTITLED

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Chairman	Pranee Nillakorn (Assistant Professor Pranee Nillakorn, Ph.D.)
Member and Advisor	Kamon Budsaba (Associate Professor Kamon Budsaba, Ph.D.)
Member and Co-Advisor	A. Volodin (Professor Andrei Igorevich Volodin, Ph.D.)
Member and Co-Advisor	Teerawat Simmachan (Teerawat Simmachan, Ph.D.)
Member	Wararit Panichkitkosolkul (Assistant Professor Wararit Panichkitkosolkul, Ph.D.)
Dean	P. Sermsuk (Associate Professor Pakorn Sermsuk, M.Sc.)

Thesis Title	BOOTSTRAP CONFIDENCE INTERVALS FOR A POPULATION MEAN OF CRACK DISTRIBUTION
Author	Miss Preya Pichetverachai
Degree	Master of Science (Applied Statistics)
Department/Faculty/University	Department of Mathematics and Statistics Faculty of Science and Technology Thammasat University
Thesis Advisor	Associate Professor Kamon Budsaba, Ph.D.
Thesis Co-Advisor	Professor Andrei Volodin, Ph.D. Teerawat Simmachan, Ph.D.
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ABSTRACT

The purpose of this paper is to compare the coverage probabilities and the average interval lengths of the confidence interval for a population mean based on the independent and dependent bootstrap procedures. We explore the following three methods for both independent and dependent bootstrap procedures: Bootstrap-t confidence interval method, the Percentile confidence interval method, and the Modified Percentile confidence interval method. In this paper, we generate a sample from Crack distribution with specified parameters. Both independent and dependent bootstrap confidence intervals vary with the sample size n, the coverage probabilities of each confidence interval increase and the average interval lengths decrease as the sample size n increases. In theoretical part of the thesis we find a novel method of finding moments of the Crack distribution in much simpler way than it has been done before.

Keywords: coverage probability, average interval lengths, Bootstrap-t confidence interval, Percentile confidence interval, Modified Percentile confidence interval.

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Miss Preya Pichetverachai

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CHAPTER 1
INTRODUCTION

1.1 Statement of the Problems and Importance of the Research

In this thesis we are looking at some problems of the Reliability Theory that have numerous applications in Engineering, Finance, Physics, Statistics, and Economics. One of the important class of distributions which is considered in the Reliability theorem is the family of lifetime distributions. In the most cases when we deal with a stochastic model for an applied problem, then the model is widely explained by a lifetime distribution. The information explained by the lifetime distribution is used by practitioners to make a forcast of the rate of events for a given population, and to forcast the expected lifetime for machines.

The common lifetime distributions in data analysis include Exponential distribution, Weibull distribution, Extreme Value distribution, Log-normal distribution, Gamma distribution, Birnbaum-Saunders distribution, Inverse Gaussian distribution, Length Biased Inverse Gaussian distribution, and Crack distribution. In this research, we will focus on Crack distribution which contains Inverse Gaussian distribution, Birnbaum-Saunders distribution, and Length Biased Inverse Gaussian distribution as special cases. The probability density function of the Crack distribution is given by

$$f_{CR}(x;\lambda,\nu,p)=\frac{1}{\nu\sqrt{2\pi}}\left[p\lambda\left(\frac{\nu}{x}\right)^{3/2}+(1-p)\left(\frac{\nu}{x}\right)^{1/2}\right]\exp\left[-\frac{1}{2}\left(\sqrt{\frac{x}{\nu}}-\lambda\sqrt{\frac{\nu}{x}}\right)^{2}\right]$$

where $x>0,\lambda>0,\nu>0$, and $0\le p\le 1$

Furthermore, to check the goodness-of-fit of the Crack lifetime distribution we consider four data sets taken from Balakrishnan (2009), which come from diverse fields such as (S_1) actuarial science, (S_2) environment, (S_3) toxicology, and (S_4) engineering. The reason for choosing these data is that they allow us to show:

1. How in different fields it is necessary to have positively skewed distribution.

2. The crack model is an appropriate distribution for describing a wide verity of data due to its great flexibility and many interesting properties.

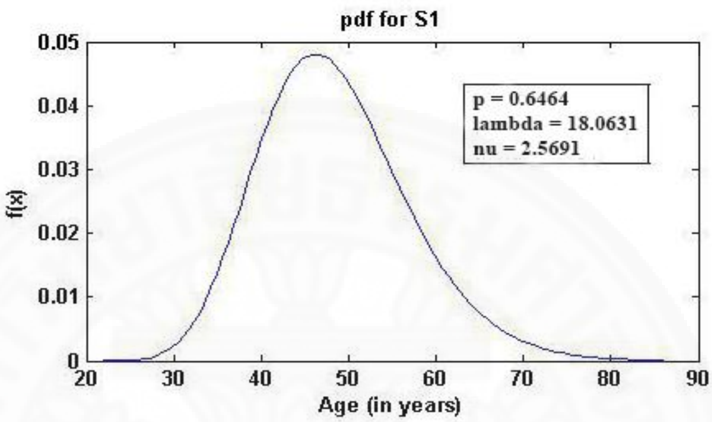
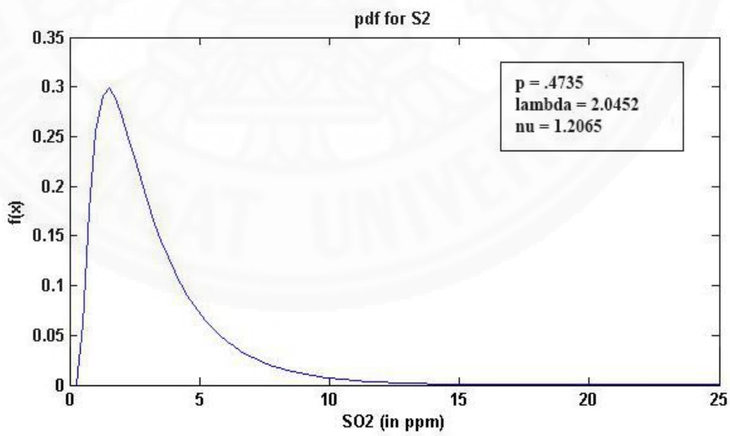


Figure 1.1: The density function for S_1 when the method of moment estimators are

$\hat{p} = 0.6464$, $\hat{\lambda} = 18.0631$, and $\hat{\nu} = 2.5691$.



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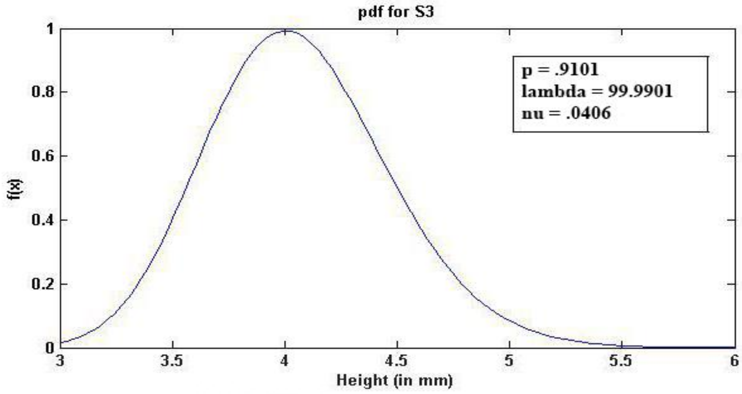

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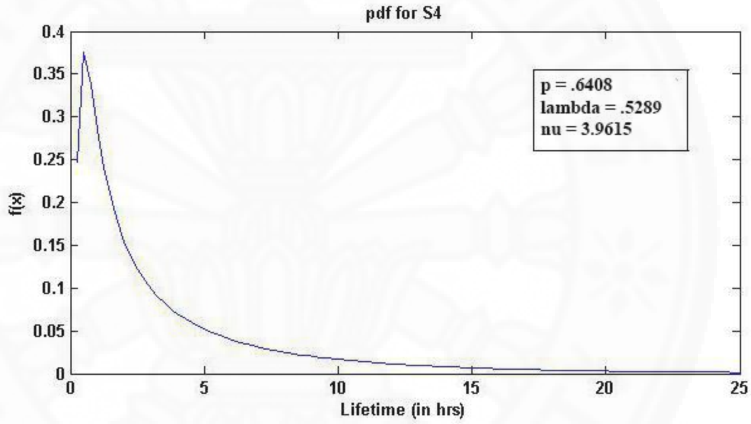


Figure 1.4: The density function for S_4 when the method of moment estimators are

$\hat{p} = 0.6408$, $\hat{\lambda} = 0.5289$, and $\hat{\nu} = 3.9615$.

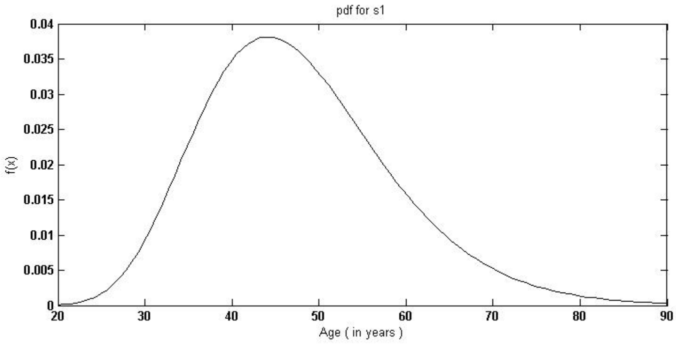


Figure 1.5: The density function for S_1 when the maximum likelihood estimators are

$\hat{p} = 0.5386, \ \hat{\lambda} = 18.7682$, and $\hat{\nu} = 2.4868$

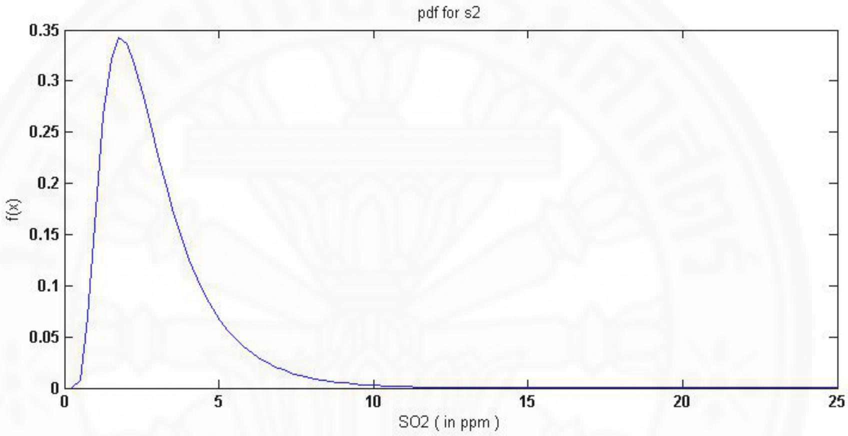


Figure 1.6: The density function for S_2 when the maximum likelihood estimators are

$\hat{p} = 0.9968, \ \hat{\lambda} = 3.0880$, and $\hat{\nu} = 0.9463$.

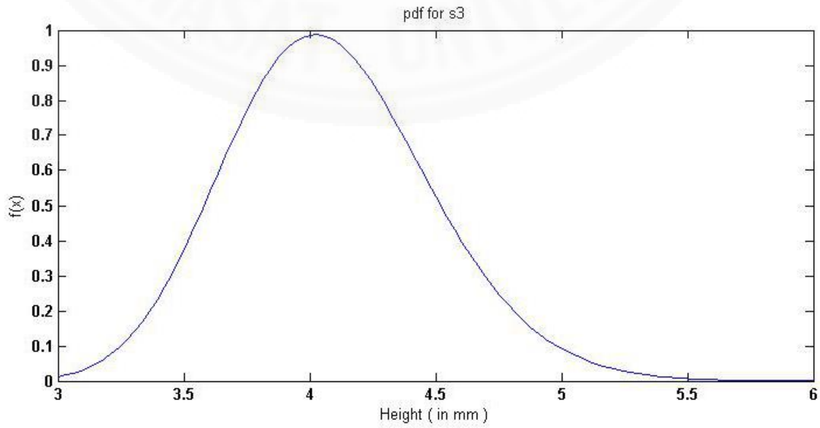


Figure 1.7: The density function for S_3 when the maximum likelihood estimators are

$\hat{p} = 0.8982, \ \hat{\lambda} = 99.9900$, and $\hat{\nu} = 0.0408$.

Applications of bootstrap methods have been reported in many areas, such as Geophysics, Engineering, Imaging, Pattern recognition, Computer vision, and Environmental techniques to signal processing practitioners with the hope that they will solve problems which may be intractable with classical tools. Bootstrap method is a statistical method that is used to calculate the standard errors of statistic value which obtain from random sample such as statistic value might be mean, median, correlation coefficient, proportion, and odds ratio.

The main focus of the present investigation is to compare different types of confidence intervals for the mean of the Crack distribution. The work on the validity of bootstrap estimator of a parameter has received much attention in recent years due to growing demand for procedure, both theoretical and computational.

Bootstrap method is based on a repetitive sampling which results in a very accurate estimate of the population mean and we do not have to guess for values of parameters. To sum up, in this thesis we are interested in bootstrap confidence intervals for a population mean of the Crack distribution.

1.2 Research Objectives

Theoretical Part

1. Derive the properties of Crack distribution by developing a new method for finding the raw moments of Crack distribution.
2. Derive the moment generating function for the Length Biased Inverse Gaussian distribution.

Computational Part

Compare the coverage probability and average interval lengths for the population mean of some classes of bootstrap confidence intervals. We compare three methods for independent and three methods for dependent bootstrap procedure:

1. The Bootstrap-t confidence interval method.
2. The Percentile confidence interval method.
3. The Modified Percentile confidence interval method.

1.3 Research Hypothesis

Computational Part

1. The Modified Percentile confidence interval method with $\theta = 0.85$ (see definition below) will give the higher coverage probabilities than the Modified Percentile confidence interval method with $\theta = 0.75$, and consider at 90% confidence level.
2. The dependent bootstrap confidence interval for the population mean gives shorter average interval lengths that of the independent bootstrap confidence interval.

1.4 Research Scope

Scope of this thesis includes the followings:

Theoretical Part

1. Derive the properties of the Crack distribution.
2. Develop a new method to find the first four raw moments of the Crack distribution

Computational Part

1. Compare three confidence interval estimation methods for the population mean for both of independent and dependent bootstrap procedure.
   These are:
   - The Bootstrap-t confidence interval method

- The Percentile confidence interval method
- The Modified Percentile confidence interval method with $\theta = 0.75$ and $\theta = 0.85$(these are commonly used values).

2. This study is restricted to generate the original sample from Crack distribution, we use all combinations of

   $\lambda = 2,5,10,20,50,$

   $\nu = 1,5,10,50,$

   $p = 0,0.25,0.5,0.75,1.$

3. We will considered for the simulations $m = n$ samples of size $n = 10,50,100.$
4. Simulations are repeated the 2,000 times bootstrap samples and copy $k = 2,4,6,8,10,12,20,30,40$. Thus, the coverage probabilities and the average interval lengths are computed from 1,000 intervals
5. Consider at 90% confidence level for all method.

1.5 Criteria to Compare

Computational Part

We compare the following three methods for both independent and dependent bootstrap procedures: Bootstrap-t confidence interval method, the Percentile confidence interval method, and the Modified Percentile confidence interval method. The criteria to compare is determined by the highest coverage probability and shortest average interval length.

1.6 Research Advantage

This research contains new contributions as the following:

1. This study provides confidence intervals based on the independent and dependent bootstrap procedures for a distribution that has not been considered before.
2. In this study, we provide the statistical knowledge of a bootstrap confidence interval for the population mean of the Crack distribution.

1.7 Notations

The following notations will be used throughout the thesis:

λ	Parameter corresponds to the thickness of a machine element, $\lambda > 0$.
ν	Parameter corresponds to the nominal treatment pressure on a machine element, $\nu > 0$.
p	Weighted parameter, $0 \le p \le 1$.
$E[X]$	Mathematical expectation or expected value or the first raw moment of the random variable X.
$E[Y]$	Mathematical expectation or expected value or the first raw moment of the random variable Y.
$E[Z]$	Mathematical expectation or expected value or the first raw moment of the random variable Z.
~	Distributed as or according to.
$\phi_x(t)$	The moment generating function of a random variable X.
μ'_k	The k^{th} population raw moment, i.e., $E[X^k]$, expected value of the k^{th} power of the random variable X.

X	The random variable.
f	Probability density function (pdf.).
$BS(\lambda,\nu)$	Birnbaum-Saunders distribution with parameters λ and ν.
$IG(\lambda,\nu)$	Inverse Gaussian distribution with parameters λ and ν.
$LB(\lambda,\nu)$	Length Biased Inverse Gaussian distribution with parameters λ and ν.
$CR(\lambda,\nu,p)$	Crack distribution with parameters λ, ν and p.
$\bar{X}_0$	Original sample mean.
S_0	Original sample standard deviation.
$\bar{X}_b^*$	Independent bootstrap sample mean.
S_b^*	Independent bootstrap sample standard deviation.
$\bar{X}'_{kb}$	Dependent bootstrap sample mean.
S'_{kb}	Dependent bootstrap sample standard deviation.
k	Number of copy from original data without replacement.
B	Bootstrap sample size.

CHAPTER 2
REVIEW OF LITERATURE

2.1 Review of the Related Literature

In this section**,** we first review the literature on the three-parameter fatigue lifetime Crack distribution, which contains the following two-parameter distributions as particular cases: Inverse Gaussian, Birnbaum-Saunders and Length Biased Inverse Gaussian distribution. After we review the literature on the bootstrap confidence intervals.

We start with a literature survey on the Inverse Gaussian distribution. It was introduced in the context of Brownian motion by Schrodinger and Smoluchowsky (1915) and later re-discovered by Wald (1947) as the distribution of a sample in a sequential ratio test. In 1989, Chhikara and Folks presented some statistical properties of the Inverse Gaussian distribution which similar to the normal distribution.

Next, we review the literature survey on the Birnbaum-Saunders distribution. It was proposed by Birnbaum and Saunders (1969) as a failure lifetime distribution. They considered some closure properties of this family and give a comparison with other families such as the lognormal distribution.

The parametric estimation for the parameters of Birnbaum-Saunders lifetime distribution based on the new parameterization had studied by Budsaba et. al. (2008). A new parameterization of Birnbaum-Saunders lifetime distribution is considered. Importantly, the physical phenomena of this study are fitted by the re-parameterization since the proposed parameters correspond or specify the thickness of the sample and the nominal treatment loading on the sample.

Next, we review of the Length Biased Inverse Gaussian distribution. Gupta and Akman (1998) established statistical properties involving the arithmetic and harmonic means of the Length Biased Inverse Gaussian distribution, and applied some of the results from Sen (1987) in order to develop confidence intervals, hypothesis testing procedures for the mean, and the estimation of the coefficient of variation of the Inverse Gaussian distribution based on the Length Biased data.

Now we review the literature on the Crack distribution in Bowonrattanaset and Budsaba (2011). This distribution is defined by adding a new weight parameter p to Inverse Gaussian and Length Biased Inverse Gaussian distributions. Because of that, the Crack distribution contains Inverse Gaussian, Birnbaum-Saunders, and Length Biased Inverse Gaussian distribution as particular cases. Bowonrattanaset and Budsaba (2011) also presented the characteristic function of the Crack distribution. In 2013, Duangsaphon and Budsaba studied the point estimation and the confidence interval estimations in order to construct and investigate theoretical properties and develop the estimation techniques for the Crack distribution.

Now we will present a brief literature review on Bootstrap procedure. Efron (1979) introduced the bootstrap as a tool to estimate the standard error of a statistic. The resampling of the observations with replacement produces independent and identically distributed random variables. In 1980, Gross introduced the concept of resampling without replacement, which produces dependent random variables but still identically distributed. This is important for applications in the sampling from finite population.

In addition, the dependent bootstrap method is suggested as a method to reduce variation of estimators by Smith and Taylor (2001). The purpose of this paper was to establish some properties of the dependent bootstrapping for some estimation, and compare the coverage probabilities and average interval lengths of confidence intervals based on the dependent bootstrap method.

In 2008, Tosasukul compared the coverage probabilities and average interval lengths of confidence intervals based on the independent and dependent bootstrap procedure that are calculated from following three methods: the Bootstrap-t, the Percentile, and the Modified Percentile confidence interval method for the population mean. The 90% confidence level has been considered. The distributions of the original data are Normal, Beta, and Gamma. As the result, Tosasukul (2008) concluded that for all distributions and sample sizes the Modified Percentile dependent bootstrap confidence interval method with $\theta = 0.85$ gives the coverage probabilities higher than or equal to the coverage probabilities of the Modified Percentile dependent bootstrap confidence interval method with $\theta = 0.75$. Moreover, the coverage probabilities of factor k that represents the number of copies of the original sample. The coverage probabilities of the independent and dependent bootstrap confidence intervals are similar when replication factor k is confidence intervals. Besides, for all distribution, the average interval lengths of each confidence interval decrease when the sample size n increases.

2.2 Theoretical Backgrounds for the Birnbaum-Saunders Distribution

The Birnbaum-Saunders distribution arises as a fatigue lifetime model which is commonly used on applications of the reliability theory for products with failure due to developing of fatigue cracks. This distribution helps us to explain how material failure occurs because of a development and growth of a dominant crack. According to Birnbaum and Saunders (1969), a continuous random variable has a Birnbaum-Saunders distribution if the probability density function with the classical parameters is

$$f_{BS}(x;\alpha,\beta) = \frac{x+\beta}{2\alpha\sqrt{2\pi\beta}x^{3/2}} \exp\left[-\frac{1}{2\alpha^2}\left(\frac{x}{\beta}+\frac{\beta}{x}-2\right)\right],$$

where $x > 0, \alpha > 0$ is the shape parameter and $\beta > 0$ is the location parameter. The Birnbaum-Saunders distribution is a unimodal distribution with median β. The mean (μ) and variance (σ^2) are as follows:

$$\mu = \beta\left(1+\frac{\alpha^2}{2}\right)$$

$$\sigma^2 = \left(\alpha\beta^2\right)\left(1+\frac{5\alpha^2}{4}\right)$$

The cumulative distribution function of X with the classical parametrization is given by

$$F_{BS}(x;\alpha,\beta)=\Phi\left(\frac{1}{\alpha}\left[\sqrt{\frac{x}{\beta}}-\sqrt{\frac{\beta}{x}}\right]\right)$$

With the new parametrization presented in Budsaba et. al. (2008). a random variable X has the Birnbaum-Saunders distribution, denoted as $BS(\lambda,\nu)$ if its probability density function is

$$f_{BS}(x;\lambda,\nu)=\frac{1}{2\nu\sqrt{2\pi}}\left[\lambda\left(\frac{\nu}{x}\right)^{3/2}+\left(\frac{\nu}{x}\right)^{1/2}\right]\exp\left[-\frac{1}{2}\left(\sqrt{\frac{x}{\nu}}-\lambda\sqrt{\frac{\nu}{x}}\right)^{2}\right],$$

where $x>0,\lambda>0,\nu>0$. The relation between classical parameters α,β and new parameters λ,ν are as follows

$$\lambda = \frac{1}{\alpha^2}, \qquad \nu = \alpha^2\beta,$$
$$\alpha = \frac{1}{\sqrt{\lambda}}, \qquad \beta = \lambda\nu.$$

2.3 Theoretical Backgrounds for the Inverse Gaussian Distribution

According to Chikara and Folks (1989), the density function of Inverse Gaussian distribution with the classical parametrization has the following density function:

$$f(x;\alpha,\beta)=\sqrt{\frac{\beta}{2\pi}}x^{-3/2}\exp\left\{-\frac{\beta(x-\alpha)^2}{2\alpha^2x}\right\} \quad , \ x>0.$$

The parameters α and β are the shape and scale parameters, respectively.

With the new parametrization instroduced in Budsaba et. al. (2008). a random variable X has the Inverse Gaussian distribution, denoted as $IG(\lambda,\nu)$ if its probability density function is

$$f_{IG}(x;\lambda,\nu)=\frac{\lambda}{\nu\sqrt{2\pi}}\left(\frac{\nu}{x}\right)^{3/2}\exp\left[-\frac{1}{2}\left(\sqrt{\frac{x}{\nu}}-\lambda\sqrt{\frac{\nu}{x}}\right)^2\right],$$

where $x>0,\lambda>0,\nu>0$ and the corresponding distribution function is

$$F_{IG}(x;\nu,\lambda)=\Phi\left(\sqrt{\frac{x}{\nu}}-\lambda\sqrt{\frac{\nu}{x}}\right)+e^{2\lambda}\Phi\left(-\sqrt{\frac{x}{\nu}}-\lambda\sqrt{\frac{\nu}{x}}\right)$$

Interrelations between the usual parameters α , β and the new parameters λ and ν are as follows:

$$\lambda = \frac{\beta}{\alpha}, \qquad \alpha = \lambda\nu,$$
$$\nu = \frac{\alpha^2}{\beta}, \qquad \beta = \lambda^2\nu.$$

2.4 Theoretical Backgrounds for the Length Biased Inverse Gaussian Distribution

The Length Biased probability density function of its original probability density function can be defined in the following way.

Definition 2.4.1. *(Khattree,1989). Let* X *be a non-negative random variable having an absolutely continuous probability density function* f *. Let* X *have a finite first moment* $E[X]$. *A non-negative random variable* Y *is said to be the Length Biased random variable associated with* X *, if* Y *has the probability density function as follows:*

$$h(x) = \left(\frac{xf(x)}{E[X]}\right), x > 0$$

If we consider a lengh biased distribution to the Inverse Gaussian, then the probability density function of the Length Biased Inverse Gaussian (LB) distribution with the new parametrization is

$$f_{LB}(x;\lambda,\nu) = \frac{1}{\nu\sqrt{2\pi}}\left(\frac{\nu}{x}\right)^{1/2}\exp\left\{-\frac{1}{2}\left(\sqrt{\frac{x}{\nu}}-\lambda\sqrt{\frac{\nu}{x}}\right)^2\right\} x > 0.$$

We use the notation $LB(\lambda,\nu)$ for this distribution.

2.5 Theoretical Backgrounds for the Crack Distribution

The three parameter Crack distribution is formed by combining the new weight parameter to the two parameter Inverse Gaussian distribution and two parameter Length Biased Inverse Gaussian distribution. All distribtuoins are considered to be based on the new parametrization of the Birnbaum-Saunders distribution proposed by Bowonrattanaset et al.(2011).

The probability density function of the Crack distribution is given by

$$f_{CR}(x;\lambda,\nu,p) = \frac{1}{\nu\sqrt{2\pi}}\left[p\lambda\left(\frac{\nu}{x}\right)^{3/2} + (1-p)\left(\frac{\nu}{x}\right)^{1/2}\right]\exp\left[-\frac{1}{2}\left(\sqrt{\frac{x}{\nu}}-\lambda\sqrt{\frac{\nu}{x}}\right)^2\right]$$

and the cumulative distribution function of $X : CR(\lambda,\nu,p)$ is

$$F_{CR}(x;\lambda,\nu,p) = \Phi\left(\sqrt{\frac{x}{\nu}}-\lambda\sqrt{\frac{\nu}{x}}\right) - (1-2p)e^{2\lambda}\left[1-\Phi\left(\sqrt{\frac{x}{\nu}}+\lambda\sqrt{\frac{\nu}{x}}\right)\right]$$

where $x > 0, \lambda > 0, \nu > 0$, and $0 \le p \le 1$

We use the notation $CR(\lambda,\nu,p)$ for the Crack distribution. The connection of the probability density function of four distributions are as follows:

$$f_{CR}(x;\lambda,\nu,p)=\begin{cases} f_{IG}(x;\lambda,\nu) if \quad p=1 \\ f_{BS}(x;\lambda,\nu) if \quad p=\dfrac{1}{2} \\ f_{LB}(x;\lambda,\nu) if \quad p=0 \end{cases}$$

$$f_{BS}(x;\lambda,\nu)=\frac{1}{2}[\,f_{IG}(x;\lambda,\nu)+f_{LB}(x;\lambda,\nu)]$$

$$f_{CR}(x;\lambda,\nu,p)=pf_{IG}(x;\lambda,\nu)+(1-p)\,f_{LB}(x;\lambda,\nu)$$

where $x>0,\lambda>0,\nu>0$, and $0\leq p\leq 1$

2.6 Theoretical Backgrounds for the Independent Bootstrap Procedure

Let a random sample consists of observations $X_1,X_2,...,X_n$ which are identically distributed independent random variables. Let random variables $X^*_{n1},...,X^*_{nj},X^*_{nm}\,;1\leq j\leq m$, obtained as sampling m times **with replacement** from the original n observations such that for each m selections, each of $X_1,X_2,...,X_n$ has equal probability $\frac{1}{n}$ to be selected. This gives us the bootstrap sample. Namely, $X^*_{n1},...,X^*_{nj},X^*_{nm}\,;1\leq j\leq m$, is called Efron(1979) *independent bootstrap sample* from the original data $X_1,X_2,...,X_n$, with the *bootstrap sample of size m*.

For instance, we assigned the set of the original data {2,3,4,5} with the sample size of n=4 from the population. Then we took a random sample (m) of the original data with replacement, where $m=6$. We select numbers one after the other and then putting the number back each time it is selected until we have another set of 6 numbers. Assume that {5,5,2,2,4,2} were selected sample. This is an example of *the independent bootstrap sample.*

2.7 Theoretical Backgrounds for the Dependent Bootstrap Procedure

Let a random sample consists of observations $X_1, X_2,..., X_n$ which are identically distributed independent random variables. The *dependent bootstrap* random variables $X'_{kn,j}, 1 \le j \le m$, are obtained by sampling m times **without replacement** from the kn items made up of k **copies** each of the original sample $X_1, X_2,..., X_n$. Of course, we assume that $m \le nk$ for all $n \ge 1$. The dependent bootstrap is proposed as a method to reduce variation of estimators and to obtain better confidence intervals.

For instance, we assigned the set of the original data $\{2,3,4,5\}$ with the sample size of $n = 4$ from the population. We take the number of copies of the original sample as 3, that is $k = 3$ and obtain $\{2,3,4,5,2,3,4,5,2,3,4,5\}$. Then we take a random sample (m) of the original data with replacement where $m = 6$. Note that $6 = m \le nk = 12$. Assume that $\{3,5,4,2,2,2\}$ were selected sample. This is an example of *dependent bootstrap sample.*

2.8 Theory of Interval Estimation

Let x be our data set of observations taken from a population with a distribution with unknown parameter θ. The set of all possible values of the parameter θ is called a Parametric space and is denoted as Θ. Inference on θ for a set problem is the statement that $\theta \in C$ where $C \subset \Theta$ and $C = C(x)$ is determined by the value of the data x. If θ is a real-valued, then we usually prefer the set estimate C to be an interval.

Definition 2.8.1: A real-valued of parameter θ for an interval estimate based on the sample values $x = (x_1,..., x_n)$ from the sample $X = X_1, X_2,..., X_n$ is the pair of functions $L(x)$ and $U(x)$, so $L(x) \le U(x)$ for all x. For the observed data x, the inference $L(x) \le \theta \le U(x)$ is made. Both $L(x)$and $U(x)$ are random variables, so that a two-side interval is $[L(x), U(x)]$, and one-sided intervals is $(-\infty, U(x)]$ or $[L(x), \infty)$.

Definition 2.8.2: A coverage probability for the confidence interval $[L(X), U(X)]$ is $P_\theta(\theta \in [L(X), U(X)])$. It is the probability that the random interval $[L(X), U(X)]$ covers the true value of the parameter θ.

Definition 2.8.3: For an interval estimator $[L(X), U(X)]$ of θ, the confidence coefficient is $\inf_\theta P_\theta(\theta \in [L(X), U(X)])$.

Confidence intervals are based on the random sample, the true value of the parameter θ is unknown. When we write a probability statement such as $P_\theta(\theta \in [L(X), U(X)])$, it refers to the random sample X, not to nonrandom constant θ. For more details we refer to George and Roger, 1990, p.403.

2.9 Theoretical Backgrounds for the Bootstrap-t Confidence Interval Method

The bootstrap-t procedure with a good second-order properties was introduced by Hall's (1988). After that, the bootstrap-t confidence interval method was proposed by Efron and Tibshirani (1993). In addition, the dependent bootstrap-t procedure is shown to produce the estimators which have smaller variance in Smith and Taylor (2011). They also studied simulated confidence intervals and considered their coverage probabilities and average interval lengths.

2.9.1 The Bootstrap-t confidence interval method for the independent bootstrap procedure

For the bootstrap-t $(1-\alpha)100\%$ independent bootstrap confidence interval for the population mean the limits are given by

$$\left(\overline{X}_0 - t^*_{(1-\frac{\alpha}{2})} \frac{S_0}{\sqrt{n}}, \overline{X}_0 - t^*_{(\frac{\alpha}{2})} \frac{S_0}{\sqrt{n}} \right)$$

Where $t^*_{(\frac{\alpha}{2})}$ is the $B\left(\frac{\alpha}{2}\right)^{th}$ ordered value in the list of B standardized independent bootstrap sample means, and standardized bootstrap sample mean is computed using

$$t^*_b = \frac{\overline{X}^*_b - \overline{X}_0}{\frac{S^*_b}{\sqrt{m}}}, b = 1,..., B$$

Here we use the following notation.

The original sample mean $\left(\overline{X}_0\right)$ is calculated by $\overline{X}_0 = \frac{1}{n}\sum_{i=1}^{n} X_i, i = 1,2,..., n$.

The original sample standard deviation $\left(S_0\right)$ is calculated by $S_0 = \sqrt{\frac{\sum_{i=1}^{n}(X_i - \overline{X}_0)^2}{n-1}}$.

The independent bootstrap sample mean $\left(\overline{X}^*_b\right)$ is calculated by $\overline{X}^*_b = \frac{1}{m}\sum_{j=1}^{m} X^*_{jb}, j = 1,2,..., m,$ and $b = 1,2,..., B$.

The independent bootstrap sample standard deviation $\left(S^*_b\right)$ is calculated by $S^*_b = \sqrt{\frac{\sum_{j=1}^{m}(X^*_{jb} - \overline{X}^*_b)^2}{m-1}}, j = 1,2,..., m,$ and $b = 1,2,..., B$,

2.9.2 The Bootstrap-t confidence interval method for the dependent bootstrap procedure

Let $X'_{kn,j}, 1 \le j \le m$, be dependent bootstrap random variables are obtained from k **copies** each of the original sample $X_1, X_2, ..., X_n$, $m \le nk$ for all $n \ge 1$. For the bootstrap-t $(1-\alpha)100\%$ dependent bootstrap confidence interval for the population mean the limits are given by

$$\left(\bar{X}_0 - t'_{(1-\frac{\alpha}{2})} \frac{S_0}{\sqrt{n}}, \bar{X}_0 - t'_{(\frac{\alpha}{2})} \frac{S_0}{\sqrt{n}} \right)$$

Where $t'_{\left(\frac{\alpha}{2}\right)}$ is the $B\left(\frac{\alpha}{2}\right)^{th}$ ordered value in the list of B standardized dependent bootstrap sample means, and standardized bootstrap sample mean is computed using

$$t'_{kb} = \frac{\bar{X}'_{kb} - \bar{X}_0}{S'_{kb}\sqrt{\dfrac{kn-1}{m(kn-m)}}}$$

Where:

The original sample mean $\left(\bar{X}_0\right)$ is calculated by $\bar{X}_0 = \frac{1}{n}\sum_{i=1}^{n} X_i, i = 1,2,...,n$

The original sample standard deviation $\left(S_0\right)$ is calculated by $S_0 = \sqrt{\dfrac{\sum_{i=1}^{n}(X_i - \bar{X}_0)^2}{n-1}}$

The dependent bootstrap sample mean $(\bar{X}'_{kb})$ is calculated by $\bar{X}'_{kb} = \frac{1}{m}\sum_{j=1}^{m} X'_{kjb}, j = 1,2,...,m,$ and $b = 1,2,...,B$.

The dependent bootstrap sample standard deviation $\left(S'_{kb}\right)$ is calculated by $S'_{kb} = \sqrt{\frac{\sum_{j=1}^{m}(X'_{kjb} - \overline{X}'_{kb})^2}{m-1}}$, $j = 1,2,..., m,$ and $b = 1,2,..., B$,

2.10 Theoretical Backgrounds for the Percentile Confidence Interval Method

2.10.1 The Percentile confidence interval method for the independent bootstrap procedure

The Percentile $(1-\alpha)100\%$ independent bootstrap confidence interval for the population mean has the limits given by

$$\left(\overline{X}^*_{\left(\frac{\alpha}{2}\right)}, \overline{X}^*_{\left(1-\frac{\alpha}{2}\right)}\right)$$

where $\overline{X}^*_{\left(\frac{\alpha}{2}\right)}$ is the $B\left(\frac{\alpha}{2}\right)^{th}$ ordered value in the list of B standardized independent bootstrap sample means, and the independent bootstrap sample mean $\left(\overline{X}^*_b\right)$ is calculated by $\overline{X}^*_b = \frac{1}{m}\sum_{j=1}^{m} X^*_{jb}$, $j = 1,2,..., m,$ and $b = 1,2,..., B$. (Efron and Tibshirani, 1993)

2.10.2 The Percentile confidence interval method for the dependent bootstrap procedure

The Percentile $(1-\alpha)100\%$ dependent bootstrap confidence interval for the population mean has the limits given by

$$\left(\bar{X}'^{(\frac{\alpha}{2})}, \bar{X}'^{(1-\frac{\alpha}{2})} \right)$$

where $\bar{X}'_{\left(\frac{\alpha}{2}\right)}$ is the $B\left(\frac{\alpha}{2}\right)^{th}$ ordered value in the list of B standardized dependent bootstrap sample means, and the dependent bootstrap sample mean with replication factors k $\left(\bar{X}'_{kb}\right)$ is calculated by $\bar{X}'_{kb} = \frac{1}{m}\sum_{j=1}^{m} X'_{kjb}$, $j = 1,2,...,m,$ and $b = 1,2,...,B$. For each $\bar{X}'_{kb}$ are sample of size m drawing without replacement from the collection of kn items made up of k copies, where $m \leq kn$. (Smith and Taylor, 2011)

2.11 Theoretical Backgrounds for the Modified Percentile Confidence Interval Method

2.11.1 The Modified Percentile confidence interval method for the independent bootstrap procedure

The Modified Percentile $(1-\alpha)100\%$ independent bootstrap confidence interval for the population mean has the limits given by

$$\left(\bar{X}^*_{(\frac{p^*}{2})}, \bar{X}^*_{(1-\frac{p^*}{2})} \right)$$

Where $\bar{X}^*_{\left(\frac{p^*}{2}\right)}$ is the $B\left(\frac{p^*}{2}\right)^{th}$ ordered value in the list of B standardized independent bootstrap sample means, while the $\frac{p^*}{2}$ is $1-\Phi\left(Z_{\frac{p^*}{2}}\right) = \frac{p^*}{2}$, and calculated $Z_{\frac{p^*}{2}}$ by

$$Z_{\frac{p^*}{2}} = \theta\sqrt{\frac{kn-1}{kn-m}}Z_{\frac{\alpha}{2}} + (1-\theta)Z_{\frac{\alpha}{2}}, 0 < \theta < 1$$

Here $Z_{\frac{\alpha}{2}}$ is the standard normal $\left(1-\frac{\alpha}{2}\right)$ percentile, and the independent bootstrap sample mean $\left(\overline{X}_b^*\right)$ is calculated by $\overline{X}_b^* = \frac{1}{m}\sum_{j=1}^{m} X_{jb}^*, \; j = 1,2,...,m,$ and $b = 1,2,...,B$. (Efron and Tibshirani, 1993) (Usually we take $\theta = 0.75$ and $\theta = 0.85$)

2.11.2 The Modified Percentile confidence interval method for the dependent bootstrap procedure

The Modified Percentile $(1-\alpha)100\%$ dependent bootstrap confidence interval for the population mean has the limits given by

$$\left(\overline{X}'_{\left(\frac{p^*}{2}\right)}, \overline{X}'_{\left(1-\frac{p^*}{2}\right)}\right)$$

where $\overline{X}'_{\left(\frac{p^*}{2}\right)}$ is the $B\left(\frac{p^*}{2}\right)^{th}$ ordered value in the list of B standardized dependent bootstrap sample means, while the $\frac{p^*}{2}$ is $1-\Phi\left(Z_{\frac{p^*}{2}}\right) = \frac{p^*}{2}$, and calculated $Z_{\frac{p^*}{2}}$ by

$$Z_{\frac{p^*}{2}} = \theta\sqrt{\frac{kn-1}{kn-m}}Z_{\frac{\alpha}{2}} + (1-\theta)Z_{\frac{\alpha}{2}}, 0 < \theta < 1$$

Here $Z_{\frac{\alpha}{2}}$ is the standard normal $\left(1-\frac{\alpha}{2}\right)$ percentile, and the dependent bootstrap sample mean (X'_{kb}) is calculated by $\overline{X}'_{kb} = \frac{1}{m}\sum_{j=1}^{m} X'_{kjb}, \; j = 1,2,..,m,$ and $b = 1,2,...,B$.

For each $\overline{X}'_{kb}$ are sample of size m drawing without replacement from the collection of kn items made up of k copies, where $m \le kn$. (Smith and Taylor, 2011).

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Research Methodology of Theoretical Part

The purpose of the theoretical part of the thesis is to derive a new method of obtaining the first four raw moments of the Crack distribution. This method is much simpler than the previous known and is based on the relationship between the moment of the Crack, Inverse Gaussian, and Length Biased Inverse Gaussian distributions.

There are five sections in the theoretical part in order to derive moments of the Crack distribution. In the first section, we establish the relationship between moments of the Length Biased Inverse Gaussian and Inverse Gaussian distributions. In second section, we establish the relationship between moments of the Crack, Inverse Gaussian and Length Biased Inverse Gaussian distribution. In third section, we derive the first five raw moments of the Inverse Gaussian distribution. In the next section, we find the first four raw moments of the Length Biased Inverse Gaussian distribution. In the last section, we obtain the first four raw moments of the Crack distribution based on the findings of the previous sections.

3.2 Research Methodology of Computational Part

The main purpose of the computational part is to compare the coverage probabilities and average interval lengths for a population mean of the Crack distribution for some classes of bootstrap confidence intervals. The comparisons are made for 3 methods of both independent and dependent bootstrap procedure: Bootstrap-t confidence interval method, the Percentile confidence interval method, and the Modified Percentile confidence interval method with $\theta = 0.75$, and $\theta = 0.85$. Using version 3.2.2 of R program and Monte-Carlo technique, we simulate 1,000 samples of three levels of sample sizes n $(n = 10, 50, 100)$ from the Crack distribution with parameters $\lambda = 2,5,10,20,50$, $\nu = 1,5,10,50$, and $p = 0,0.25,0.5,0.75,1$. For each sample of size n, we calculate different types of 90% confidence intervals for the population mean and the actual coverage probability for each type of the intervals are computed. For each sample the dependent bootstrap 90% confidence level for the population mean was formed by drawing 2,000 dependent bootstrap samples of size n, and replication factors $k = 2,4,6,8,10,12,20,30,40$. Using the 2,000 dependent bootstrap samples, the Bootstrap-t, Percentile, and Modified Percentile confidence intervals for the population mean are obtained. Next, the same procedure is followed using the independent bootstrap method.

Hence the steps of this study are following:

1. Set sample size and three parameters of Crack distribution (n, λ, ν, p)
2. Generate a sample from Crack distribution with specified parameters.
3. Generate the classical 90% confidence interval for the population mean.
4. Generated the independent (IB) and dependent bootstrap samples (DB) from the original sample.
5. Compute the sample mean and standard deviation from the independent and dependent bootstrap samples, and compute the standardized bootstrap sample mean.
6. Repeat the fourth step 2,000 times.
7. Compute the Bootstrap-t 90% confidence interval for the independent bootstrap procedure (IT) by the formula

$$(\overline{X}_0 - t^*_{(1-0.05)}\frac{S_0}{\sqrt{n}}, \overline{X}_0 - t^*_{(0.05)}\frac{S_0}{\sqrt{n}})$$

and for the dependent bootstrap procedure (DT) by the formula

$$(\overline{X}_0 - t'^{(1-0.05)}\frac{S_0}{\sqrt{n}}, \overline{X}_0 - t'^{(0.05)}\frac{S_0}{\sqrt{n}})$$

8. Compute the Percentile 90% confidence interval method, and interval length for the independent bootstrap procedure (IP) by the formula

$$(\bar{X}^{*(0.05)}, \bar{X}^{*(1-0.05)})$$

and dependent bootstrap procedure (DP) by the formula

$$(\bar{X}'_{(0.05)}, \bar{X}'_{(1-0.05)})$$

9. Compute the Modified Percentile 90% confidence interval method, and interval length for the independent bootstrap procedure (IM) by the formula

$$\left(\bar{X}^{*}_{\frac{p^*}{2}}, \bar{X}^{*}_{(1-\frac{p^*}{2})}\right)$$

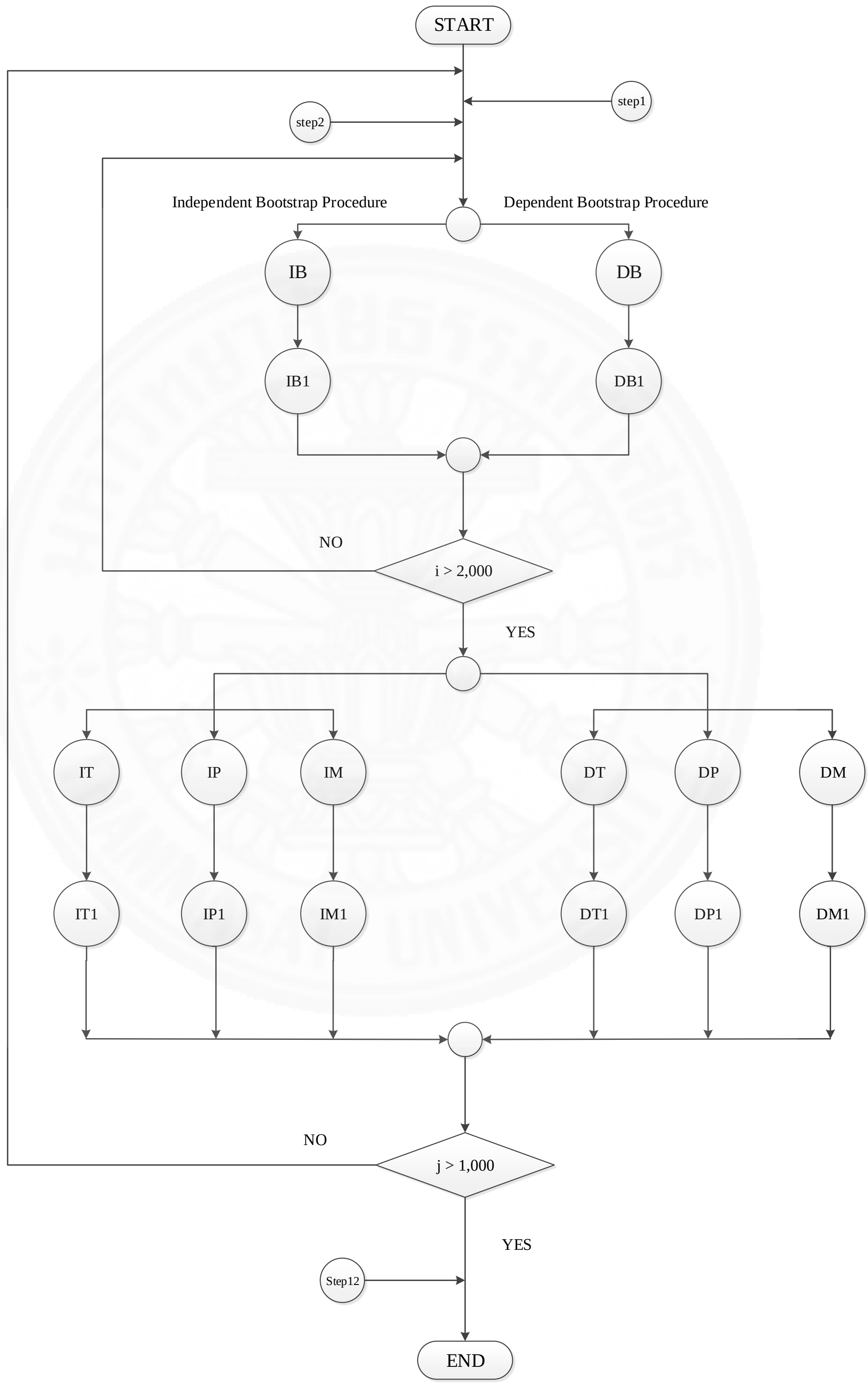
and dependent bootstrap procedure (DM) by the formula

$$\left(\bar{X}'_{\left(\frac{p^*}{2}\right)}, \bar{X}'_{\left(1-\frac{p^*}{2}\right)}\right)$$

10. For each of this intervals note its cover of the true mean and is its length.
11. Repeat these step 1,000 times.
12. Compute the coverage probabilities, and average interval lengths for all three methods of the independent and dependent bootstrap procedure.

Programming flowchart for the simulation study is shown in figure 3.1.

Figure 3.1: Programming flowchart for the simulation study



Notations:

IB	Independent bootstrap procedure
DB	Dependent bootstrap procedure
IT	The Bootstrap-t independent bootstrap confidence interval
IP	The Percentile independent bootstrap confidence interval
IM	The Modified Percentile independent bootstrap confidence interval
DT	The Bootstrap-t dependent bootstrap confidence interval
DP	The Percentile dependent bootstrap confidence interval
DM	The Modified Percentile dependent bootstrap confidence interval

CHAPTER 4
THEORETICAL RESULTS

4.1 Introduction

In this chapter, we derive a few results in order to obtain the first four raw moments of the Crack distribution. The steps are following:

1. Establish the relationship between moments of the Length Biased Inverse Gaussian and Inverse Gaussian distributions.
2. Establish relationship between moments of the Crack distribution, Inverse Gaussian distribution and Length Biased Inverse Gaussian distribution.
3. Derive the first five raw moments of the Inverse Gaussian distribution.
4. Find the first four raw moments of the Length Biased Inverse Gaussian distribution.
5. Obtain the first four raw moments of the Crack distribution based on steps 1, 2, 3, and 4.

We remind that the *Inverse Gaussian distribution* has density function

$$f_{IG}(x,\lambda,\nu)=\frac{\lambda}{\nu\sqrt{2\pi}}\left(\frac{\nu}{x}\right)^{\frac{3}{2}}\exp\left\{-\frac{1}{2}\left(\lambda\sqrt{\frac{\nu}{x}}-\sqrt{\frac{x}{\nu}}\right)^{2}\right\},x>0.$$

We use the notation IG(λ,ν) for this distribution.

The *Length Biased inverse Gaussian* distribution has the density function:

$$f_{LB}(x;\lambda,\nu) = \frac{1}{\sqrt{2\pi\nu}}\left(\frac{x}{\nu}\right)^{\frac{1}{2}} \exp\left\{-\frac{1}{2}\left(\lambda\sqrt{\frac{\nu}{x}} - \sqrt{\frac{x}{\nu}}\right)^2\right\}, x > 0.$$

We use the notation LB(λ,ν) for this distribution.

The *Crack distribution* has the density function

$$f_{CR}(x; p,\lambda,\nu) = pf_{IG}(x;\lambda,\nu) + (1-p) f_{LB}(x;\lambda,\nu), x > 0, \lambda > 0, \nu > 0, 0 \le p \le 1.$$

We use the notation CR(p,λ,ν) for this distribution.

4.1.1 The relationship between moments of the Length Biased and Inverse Gaussian distributions.

Theorem. *Let* $Y \sim IG(\lambda,\nu)$ *and* $Z \sim LB(\lambda,\nu)$ *then the* r*th moment of* Z *for* $r = 1,2,3,...$ *is given by*

$$E[Z^r] = \frac{1}{\lambda\nu} E[Y^{r+1}] \tag{4.1}$$

Proof.

$$E[Z^r] = \int_0^\infty x^r f_{LB}(x;\lambda,\nu) dx$$

$$= \int_0^\infty x^r \frac{1}{\nu\sqrt{2\pi}}\left(\frac{\nu}{x}\right)^{\frac{1}{2}} \exp\left[-\frac{1}{2}\left(\sqrt{\frac{x}{\nu}} - \lambda\sqrt{\frac{\nu}{x}}\right)^2\right] dx$$

$$= \int_0^\infty x^{r+1} \frac{1}{\lambda\nu\sqrt{2\pi}} \frac{\lambda}{\nu}\left(\frac{\nu}{x}\right)^{\frac{3}{2}} \exp\left[-\frac{1}{2}\left(\sqrt{\frac{x}{\nu}} - \lambda\sqrt{\frac{\nu}{x}}\right)^2\right]dx$$

$$= \frac{1}{\lambda\nu}\int_0^\infty x^{r+1} \frac{\lambda}{\lambda\nu\sqrt{2\pi}} \left(\frac{\nu}{x}\right)^{\frac{3}{2}} \exp\left[-\frac{1}{2}\left(\sqrt{\frac{x}{\nu}} - \lambda\sqrt{\frac{\nu}{x}}\right)^2\right]dx$$

$$= \frac{1}{\lambda\nu}\int_0^\infty x^{r+1} f_{IG}(x;\lambda,\nu)dx$$

$$= \frac{1}{\lambda\nu} E[Y^{r+1}]$$

Thus $E[Z^r] = \frac{1}{\lambda\nu} E[Y^{r+1}],\ r = 1,2,3,...$

4.1.2 The relationship between moments of the Crack distribution, Inverse Gaussian distribution and Length Biased Inverse Gaussian distribution

Theorem. *Let* $X \sim CR(\lambda,\nu,p)$, $Y \sim IG(\lambda,\nu)$, *and* $Z \sim LB(\lambda,\nu)$. *Then the* r*th moment of* X *for* $r = 1,2,3,...$ *is given by*

$$E[X^r] = pE[Y^r] + (1-p)E[Z^r], \tag{4.2}$$

that is,

$$E[X^r] = pE[Y^r] + \frac{1-p}{\lambda\nu} E[Y^{r+1}]. \tag{4.3}$$

Proof. We have

$$E[X^r] = \int_0^\infty x^r f_{CR}(x;\lambda,\nu,p)dx$$

$$= \int_0^\infty x^r \left[p f_{IG}(x;\lambda,\nu) + (1-p) f_{LB}(x;\lambda,\nu) \right] dx$$

$$= p\int_0^\infty x^r f_{IG}(x;\lambda,\nu) + (1-p)\int_0^\infty x^r f_{LB}(x;\lambda,\nu)dx$$

$$= pE[Y^r] + (1-p)E[Z^r]$$

$$= pE[Y^r] + \frac{1-p}{\lambda\nu} E[Y^{r+1}]$$

Thus $E[X^r] = pE[Y^r] + \frac{1-p}{\lambda\nu} E[Y^{r+1}]$

4.1.3 Derive first five raw moments of the Inverse Gaussian distribution

Theorem. *Let* $Y \sim IG(x;\lambda,\nu)$ *and the Moment Generating Function of* Y *is given by* $\phi_Y(t) = \exp[\lambda(1-\sqrt{1-2\nu t})]$. *Then the first five raw moments of* Y *are given by*

$$E[Y] = \lambda\nu \tag{4.4}$$

$$E[Y^2] = \lambda\nu^2(\lambda+1) \tag{4.5}$$

$$E[Y^3] = \lambda\nu^3(\lambda^2+3\lambda+3) \tag{4.6}$$

$$E[Y^4] = \lambda\nu^4(\lambda^3+6\lambda^2+15\lambda+15) \tag{4.7}$$

$$E[Y^5] = \lambda\nu^5(\lambda^4 + 10\lambda^3 + 45\lambda^2 + 105\lambda + 105) \tag{4.8}$$

Proof. The Moment Generating Function of the Inverse Gaussian distribution is $\phi_Y(t) = \exp[\lambda(1-\sqrt{1-2\nu t})]$. Then the first derivative of the Moment Generating Function is:

$$\frac{\partial}{\partial t}[\phi_Y(t)] = \exp[\lambda(1-\sqrt{1-2\nu t})]\lambda\nu(1-2\nu t)^{-\frac{1}{2}}$$

Second derivative:

$$\frac{\partial^2[\phi_Y(t)]}{\partial t^2} = \lambda\nu^2\Big[\exp[\lambda(1-\sqrt{1-2\nu t})\Big](1-2\nu t)^{-\frac{3}{2}} + \lambda^2\nu^2\exp\Big[\lambda(1-\sqrt{1-2\nu t})\Big](1-2\nu t)^{-1}$$

$$= \lambda\nu^2\Big[\exp[\lambda(1-\sqrt{1-2\nu t})]\Big](1-2\nu t)^{-\frac{3}{2}} + \lambda^2\nu^2\exp\Big[\lambda(1-\sqrt{1-2\nu t})\Big](1-2\nu t)^{-1}.$$

Third derivative:

$$\frac{\partial^3[\phi_Y(t)]}{\partial t^3} = \lambda\nu^2\{\exp[\lambda(1-\sqrt{1-2\nu t})]3\nu(1-2\nu t)^{-\frac{5}{2}} + \lambda\nu\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-2}$$

$$+ 2\lambda\nu\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-2} + \lambda^2\nu\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-\frac{3}{2}}\}$$

$$= \lambda\nu^3\{\exp[\lambda(1-\sqrt{1-2\nu t})]3(1-2\nu t)^{-\frac{5}{2}} + \lambda\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-2}$$

$$+ 2\lambda\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-2} + \lambda^2\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-\frac{3}{2}}\}$$

Fourth derivative:

$$\frac{\partial^4[\phi_Y(t)]}{\partial t^4} = \lambda\nu^4\{15\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-\frac{7}{2}} + 15\lambda\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-3}$$

$$+ 6\lambda^2\nu\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-\frac{5}{2}} + \lambda^3\nu\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-2}\}$$

Fifth derivative

$$\frac{\partial^5[\phi_Y(t)]}{\partial t^5} = \lambda\nu^5\{105\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-\frac{9}{2}} + 105\lambda\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-4}$$

$$+ 45\lambda^2\nu\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-\frac{7}{2}} + 10\lambda^3\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-3}$$

$$+ \lambda^4\exp[\lambda(1-\sqrt{1-2\nu t})](1-2\nu t)^{-\frac{5}{2}}\}$$

Therefore, the first five non-central moments of Y are

$$E(Y) = \frac{\partial}{\partial t}[\phi_Y(t)]|_{t=0} = \lambda\nu$$

$$E(Y^2) = \frac{\partial^2}{\partial t^2}[\phi_Y(t)]|_{t=0} = \lambda\nu^2(\lambda+1)$$

$$E(Y^3) = \frac{\partial^3}{\partial t^3}[\phi_Y(t)]|_{t=0} = \lambda\nu^3(\lambda^2+3\lambda+3)$$

$$E(Y^4) = \frac{\partial^4}{\partial t^4}[\phi_Y(t)]|_{t=0} = \lambda\nu^4(\lambda^3+6\lambda^2+15\lambda+15)$$

$$E(Y^5) = \frac{\partial^5}{\partial t^5}[\phi_Y(t)]|_{t=0} = \lambda\nu^5(\lambda^4+10\lambda^3+45\lambda^2+105\lambda+105)$$

4.1.4 The first four raw moments of the Length Biased Inverse Gaussian distribution

Theorem. *Let* $Z \sim LB(x;\lambda,\nu)$ *, then the first four raw moments of* Z *are given by*

$$E[Z] = \nu(\lambda+1) \tag{4.9}$$

$$E[Z^2] = \nu^2\left(\lambda^2+3\lambda+3\right) \tag{4.10}$$

$$E[Z^3] = \nu^3\left(\lambda^3+6\lambda^2+15\lambda+15\right) \tag{4.11}$$

$$E[Z^4] = \nu^4\left(\lambda^4+10\lambda^3+45\lambda^2+105\lambda+105\right) \tag{4.12}$$

Proof. From Theorem 4.1.1 we have

$$E[Z^r] = \frac{1}{\lambda\nu}E[Y^{r+1}]$$

We put r = 1, 2, 3, 4 to obtain respectively,

$$E[Z] = \frac{1}{\lambda\nu}E[Y^2] \tag{4.13}$$

$$E[Z^2] = \frac{1}{\lambda\nu}E[Y^3] \tag{4.14}$$

$$E[Z^3] = \frac{1}{\lambda\nu}E[Y^4] \tag{4.15}$$

$$E[Z^4] = \frac{1}{\lambda\nu}E[Y^5] \tag{4.16}$$

Substituting equation (4.4) and (4.5) into equation (4.13), we get

$$E[Z] = \frac{1}{\lambda\nu}\left[\lambda\nu^2(\lambda+1)\right]$$

$$= \frac{1}{\lambda\nu}\left[\lambda^2\nu^2 + \lambda\nu^2\right]$$

$$= \lambda\nu + \nu$$

$$= \nu(\lambda+1)$$

Substituting equation (4.5) and (4.6) into equation (4.14), we get

$$E[Z^2] = \frac{1}{\lambda\nu}\left[\lambda\nu^3(\lambda^2+3\lambda+3)\right]$$

$$= \frac{1}{\lambda\nu}\left[\lambda^3\nu^3 + 3\lambda^2\nu^3 + 3\lambda\nu^3\right]$$

$$= \lambda^2\nu^2 + 3\lambda\nu^2 + 3\nu^2$$

$$= \nu^2\left(\lambda^2+3\lambda+3\right)$$

Substituting equation (4.6) and (4.7) into equation (4.15), we get

$$E[Z^3] = \frac{1}{\lambda\nu}\left[\lambda\nu^4(\lambda^3+6\lambda^2+15\lambda+15)\right]$$

$$= \frac{1}{\lambda\nu}\left[\lambda^4\nu^4 + 6\lambda^3\nu^4 + 15\lambda^2\nu^4 + 15\lambda\nu^4\right]$$

$$= \lambda^3\nu^3 + 6\lambda^2\nu^3 + 15\lambda\nu^3 + 15\nu^3$$

$$= \nu^3\left(\lambda^3 + 6\lambda^2 + 15\lambda + 15\right)$$

Substituting equation (4.7) and (4.8) into equation (4.16), we get

$$E[Z^4] = \frac{1}{\lambda\nu}\left[\lambda\nu^5(\lambda^4 + 10\lambda^3 + 45\lambda^2 + 105\lambda + 105)\right]$$

$$= \frac{1}{\lambda\nu}\left[\lambda^5\nu^5 + 10\lambda^4\nu^5 + 45\lambda^3\nu^5 + 105\lambda^2\nu^5 + 105\lambda\nu^5\right]$$

$$= \lambda^4\nu^4 + 10\lambda^3\nu^4 + 45\lambda^2\nu^4 + 105\lambda\nu^4 + 105\nu^4$$

$$= \nu^4\left(\lambda^4 + 10\lambda^3 + 45\lambda^2 + 105\lambda + 105\right)$$

4.1.5 The first four raw moments of the Crack distribution

Theorem *Let* $X \sim CR(x;\lambda,\nu,p)$. *Then the first four raw moments of* X *are given by*

$$\mu_1' = (\lambda + 1 - p)\nu$$

$$\mu_2' = (\lambda^2 + 3\lambda - 2\lambda p - 3p + 3)\nu^2$$

$$\mu_3' = (\lambda^3 + 6\lambda^2 + 15\lambda - 3\lambda^2 p - 12\lambda p - 15p + 15)\nu^3$$

$$\mu_4' = (\lambda^4 + 10\lambda^3 + 45\lambda^2 + 105\lambda - 4\lambda^3 p - 30\lambda^2 p - 90\lambda p - 105p + 105)\nu^4$$

Proof. From Theorem $(4.1.2)$ and equation $(4.1.3)$ we have

$$E[x^r] = pE[Y^r] + \frac{1-p}{\lambda\nu} E[Y^{r+1}]$$

We put $r = 1,2,3,4$ to obtain respectively,

$$E[X] = PE[Y] + \frac{1-p}{\lambda\nu} E[Y^2]$$

$$E[X^2] = PE[Y^2] + \frac{1-p}{\lambda\nu} E[Y^3]$$

$$E[X^3] = PE[Y^3] + \frac{1-p}{\lambda\nu} E[Y^4]$$

$$E[X^4] = PE[Y^4] + \frac{1-p}{\lambda\nu} E[Y^5].$$

Substituting equation (4.4) and (4.5), we get

$$\mu_1' = E[X]$$

$$= p(\lambda\nu) + \frac{1-p}{\lambda\nu}[\lambda\nu^2(\lambda+1)]$$

$$= (\lambda + 1 - p)\nu.$$

Substituting equation (4.5) and (4.6), we get

$$\mu_2' = E[X^2]$$

$$= p[\lambda\nu^2(\lambda+1)] + (1-p)\frac{1}{\lambda\nu}[\lambda\nu^3(\lambda^2+3\lambda+3)]$$

$$= (\lambda^2+3\lambda-2\lambda p-3p+3)\nu^2.$$

Substituting equation (4.6) and (4.7), we get

$$\mu_3' = E[X^3]$$

$$= p[\lambda\nu^3(\lambda^2+3\lambda+3)] + (1-p)\frac{1}{\lambda\nu}[\lambda\nu^4(\lambda^3+6\lambda^2+15\lambda+15)]$$

$$= (\lambda^3+6\lambda^2+15\lambda-3\lambda^2 p-12\lambda p-15p+15)\nu^3.$$

Substituting equation (4.7) and (4.8), we get

$$\mu_4' = E[X^4]$$

$$= p[\lambda\nu^4(\lambda^3+6\lambda^2+15\lambda+15)] + (1-p)\frac{1}{\lambda\nu}[\lambda\nu^5(\lambda^4+10\lambda^3+45\lambda^2+105\lambda+105)]$$

$$= (\lambda^4+10\lambda^3+45\lambda^2+105\lambda-4\lambda^3 p-30\lambda^2 p-90\lambda p-105p+105)\nu^4.$$

Hence we obtain that the first four raw moments for all three Inverse Gaussian, Length Biased Inverse Gaussian, and Crack distributions can be summarized in the following table.

Table 4.1 : The first four raw moments for Inverse Gaussian, Length Biased Inverse Gaussian, and Crack distributions.

Moment number	Inverse Gaussian distribution	Length Biased Inverse Gaussian distribution	Crack distribution
First Moment	$\lambda\nu$	$\nu(\lambda+1)$	$(\lambda+1-p)\nu$
Second Moment	$\lambda\nu^2(\lambda+1)$	$\nu^2\left(\lambda^2+3\lambda+3\right)$	$(\lambda^2+3\lambda-2\lambda p-3p+3)\nu^2$
Third Moment	$\lambda\nu^3(\lambda^2+3\lambda+3)$	$\nu^3\left(\lambda^3+6\lambda^2+15\lambda+15\right)$	$(\lambda^3+6\lambda^2+15\lambda-3\lambda^2 p-12\lambda p-15p+15)\nu^3$
Fourth Moment	$\lambda\nu^4(\lambda^3+6\lambda^2+15\lambda+15)$	$\nu^4\left(\lambda^4+10\lambda^3+45\lambda^2+105\lambda+105\right)$	$(\lambda^4+10\lambda^3+45\lambda^2+105\lambda-4\lambda^3 p-30\lambda^2 p-90\lambda p^4$ $-105p+105)\nu^4$

CHAPTER 5
COMPUTATIONAL RESULTS

The purpose of this study is to compare the coverage probabilities and average interval lengths for a population mean for some classes of bootstrap confidence intervals. The comparisons are made for 3 methods of both independent and dependent bootstrap procedure: Bootstrap-t confidence interval method, the Percentile confidence interval method, and the Modified Percentile confidence interval method with $\theta = 0.75$ and $\theta = 0.85$. We generate a sample from Crack distribution with specified parameters.

The results of this chapter classified according to the coverage probabilities and average interval lengths for the population mean for the above mentioned classes of bootstrap confidence intervals, and presented in Sections 5.1, and 5.2, respectively.

5.1 Coverage Probabilities

For simulations we considered the following values of λ, ν, p and sample size n:

$n = 10,50,100,$

$\lambda = 2,5,10,20,50,$

$\nu = 1,5,10,50,$

$p = 0,0.25,0.5,0.75,1.$

We simulate 1,000 samples of sizes $n = 10,50,100$ from Crack distribution. For each sample of size n, we calculated 90% confidence interval for the population mean and the actual coverage probability of these 1,000 intervals was computed.

Next, for each sample the dependent bootstrap 90% confidence interval for the population mean was formed by drawing 2,000 dependent bootstrap samples of size n, and replication factors (k copies) $k = 2,4,6,8,10,12,20,30,40$. Using the 2,000 dependent bootstrap samples, the Bootstrap-t, Percentile, and Modified Percentile confidence intervals for the population mean were obtained. In addition, the same procedure was followed using the independent bootstrap method.

The numerical results are summarized in Tables 5.1-5.9. When sample size n is large, the Modified Percentile dependent bootstrap confidence interval method with $\theta = 0.85$ gives higher coverage probabilities than other methods for all replication factors (k copies) and it is also close to 90% confidence level.

For example, in Table 5.9, when $n = 100$, $\lambda = 2$, $\theta = 10$, and $p = 0$ the Modified Percentile dependent bootstrap confidence interval method with $\theta = 0.85$, and $k = 40$ gives the coverage probability 0.911, while in Table 5.7, and Table 5.8, for $n = 50$, and $n = 10$, $\lambda = 2$, $\nu = 10$, and $p = 0$, the Modified Percentile dependent bootstrap confidence interval method with $\theta = 0.85$, and , the coverage probability is 0.891, and 0.868, respectively.

The coverage probabilities of the independent bootstrap confidence intervals are higher than the coverage probabilities of the dependent bootstrap confidence intervals for all three methods, replication factors, and sample sizes n.

In addition, when replication factors (k copies) increase the coverage probabilities of the dependent bootstrap confidence intervals increase for all three methods are close to confidence coefficient 0.90.

For example, in Tables 5.2, when $n = 50$, $\lambda = 50$, $\nu = 1$, and $p = 0.5$, the Bootstrap-t independent bootstrap confidence interval method has coverage probability 0.908, while the Bootstrap-t dependent bootstrap confidence interval method with $k = 40$ gives 0.896.

Table 5.1: Coverage Probabilities of mean for Crack distribution n = 10 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
2	1	0	0.951	0.913	0.616	0.793	0.836	0.850	0.872	0.880	0.889	0.901	0.908
2	1	0.25	0.952	0.898	0.633	0.799	0.833	0.852	0.868	0.871	0.886	0.890	0.892
2	1	0.5	0.948	0.895	0.631	0.788	0.839	0.848	0.861	0.865	0.877	0.883	0.885
2	1	0.75	0.94	0.880	0.613	0.785	0.834	0.844	0.857	0.858	0.872	0.873	0.877
2	1	1	0.929	0.877	0.598	0.784	0.818	0.834	0.844	0.850	0.863	0.863	0.868
2	5	0	0.951	0.913	0.616	0..793	0.836	0.850	0.872	0.880	0.889	0.901	0.908
2	5	0.25	0.952	0.898	0.633	0.799	0.833	0.852	0.868	0.871	0.886	0.890	0.892
2	5	0.5	0.948	0.895	0.631	0.788	0.839	0.848	0.861	0.865	0.877	0.883	0.885
2	5	0.75	0.94	0.880	0.613	0.785	0.834	0.844	0.857	0.858	0.872	0.873	0.877
2	5	1	0.929	0.877	0.598	0.784	0.818	0.834	0.844	0.850	0.863	0.863	0.868
2	10	0	0.951	0.913	0.616	0.793	0.836	0.850	0.872	0.880	0.889	0.901	0.908
2	10	0.25	0.952	0.898	0.633	0.799	0.833	0.852	0.868	0.871	0.886	0.890	0.892
2	10	0.5	0.948	0.895	0.631	0.788	0.839	0.848	0.861	0.865	0.877	0.883	0.885
2	10	0.75	0.94	0.880	0.613	0.785	0.834	0.844	0.857	0.858	0.872	0.873	0.877
2	10	1	0.929	0.877	0.598	0.784	0.818	0.834	0.844	0.850	0.863	0.863	0.868
2	20	0	0.951	0.913	0.616	0.793	0.836	0.850	0.872	0.880	0.889	0.901	0.908
2	20	0.25	0.952	0.898	0.633	0.799	0.833	0.852	0.868	0.871	0.886	0.890	0.892
2	20	0.5	0.948	0.895	0.631	0.788	0.839	0.848	0.861	0.865	0.877	0.883	0.885
2	20	0.75	0.94	0.880	0.613	0.785	0.834	0.844	0.857	0.858	0.872	0.873	0.877
2	20	1	0.929	0.877	0.598	0.784	0.818	0.834	0.844	0.850	0.863	0.863	0.868
2	50	0	0.951	0.913	0.616	0.793	0.836	0.850	0.872	0.880	0.889	0.901	0.908
2	50	0.25	0.952	0.898	0.633	0.799	0.833	0.852	0.868	0.871	0.886	0.890	0.892
2	50	0.5	0.948	0.895	0.631	0.788	0.839	0.848	0.861	0.865	0.877	0.883	0.885
2	50	0.75	0.94	0.880	0.613	0.785	0.834	0.844	0.857	0.858	0.872	0.873	0.877
2	50	1	0.929	0.877	0.598	0.784	0.818	0.834	0.844	0.850	0.863	0.863	0.868
5	1	0	0.963	0.897	0.630	0.804	0.845	0.860	0.866	0.873	0.881	0.885	0.893
5	1	0.25	0.966	0.913	0.631	0.803	0.845	0.853	0.868	0.881	0.900	0.901	0.909
5	1	0.5	0.969	0.911	0.603	0.797	0.847	0.859	0.872	0.888	0.895	0.904	0.899
5	1	0.75	0.962	0.915	0.593	0.798	0.842	0.872	0.879	0.887	0.890	0.905	0.907
5	1	1	0.959	0.901	0.601	0.791	0.837	0.859	0.863	0.867	0.876	0.886	0.890

Table 5.1 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
5	5	0	0.963	0.897	0.630	0.804	0.845	0.860	0.866	0.873	0.881	0.885	0.893
5	5	0.25	0.966	0.913	0.631	0.803	0.845	0.853	0.868	0.881	0.900	0.901	0.909
5	5	0.5	0.969	0.911	0.603	0.797	0.847	0.859	0.872	0.888	0.895	0.904	0.899
5	5	0.75	0.962	0.915	0.593	0.798	0.842	0.872	0.879	0.887	0.890	0.905	0.907
5	5	1	0.959	0.901	0.601	0.791	0.837	0.859	0.863	0.867	0.876	0.886	0.890
5	10	0	0.963	0.897	0.630	0.804	0.845	0.860	0.866	0.873	0.881	0.885	0.893
5	10	0.25	0.966	0.913	0.631	0.803	0.845	0.853	0.868	0.881	0.900	0.901	0.909
5	10	0.5	0.969	0.911	0.603	0.797	0.847	0.859	0.872	0.888	0.895	0.904	0.899
5	10	0.75	0.962	0.915	0.593	0.798	0.842	0.872	0.879	0.887	0.890	0.905	0.907
5	10	1	0.959	0.901	0.601	0.791	0.837	0.859	0.863	0.867	0.876	0.886	0.890
5	20	0	0.963	0.897	0.630	0.804	0.845	0.860	0.866	0.873	0.881	0.885	0.893
5	20	0.25	0.966	0.913	0.631	0.803	0.845	0.853	0.868	0.881	0.900	0.901	0.909
5	20	0.5	0.969	0.911	0.603	0.797	0.847	0.859	0.872	0.888	0.895	0.904	0.899
5	20	0.75	0.962	0.915	0.593	0.798	0.842	0.872	0.879	0.887	0.890	0.905	0.907
5	20	1	0.959	0.901	0.601	0.791	0.837	0.859	0.863	0.867	0.876	0.886	0.890
5	50	0	0.963	0.897	0.630	0.804	0.845	0.860	0.866	0.873	0.881	0.885	0.893
5	50	0.25	0.966	0.913	0.631	0.803	0.845	0.853	0.868	0.881	0.900	0.901	0.909
5	50	0.5	0.969	0.911	0.603	0.797	0.847	0.859	0.872	0.888	0.895	0.904	0.899
5	50	0.75	0.962	0.915	0.593	0.798	0.842	0.872	0.879	0.887	0.890	0.905	0.907
5	50	1	0.959	0.901	0.601	0.791	0.837	0.859	0.863	0.867	0.876	0.886	0.890
10	1	0	0.972	0.913	0.611	0.800	0.846	0.872	0.878	0.890	0.903	0.908	0.911
10	1	0.25	0.968	0.914	0.594	0.805	0.849	0.868	0.880	0.881	0.893	0.903	0.906
10	1	0.5	0.966	0.909	0.594	0.803	0.838	0.870	0.877	0.883	0.893	0.900	0.904
10	1	0.75	0.969	0.906	0.587	0.793	0.853	0.867	0.882	0.889	0.891	0.899	0.900
10	1	1	0.967	0.906	0.589	0.785	0.830	0.857	0.864	0.868	0.890	0.896	0.902
10	5	0	0.972	0.913	0.611	0.800	0.846	0.872	0.878	0.890	0.903	0.908	0.911
10	5	0.25	0.968	0.914	0.594	0.805	0.849	0.868	0.880	0.881	0.893	0.903	0.906
10	5	0.5	0.966	0.909	0.594	0.809	0.839	0.870	0.877	0.883	0.893	0.900	0.904
10	5	0.75	0.969	0.906	0.587	0.793	0.853	0.867	0.882	0.889	0.891	0.899	0.900
10	5	1	0.967	0.906	0.589	0.785	0.830	0.857	0.864	0.868	0.890	0.896	0.902
10	10	0	0.972	0.913	0.611	0.800	0.846	0.872	0.878	0.890	0.903	0.908	0.911
10	10	0.25	0.968	0.914	0.594	0.805	0.849	0.868	0.880	0.881	0.893	0.903	0.906
10	10	0.5	0.966	0.909	0.594	0.803	0.838	0.870	0.877	0.883	0.893	0.900	0.904
10	10	0.75	0.969	0.906	0.587	0.793	0.853	0.867	0.882	0.889	0.891	0.899	0.900
10	10	1	0.967	0.906	0.589	0.785	0.830	0.857	0.864	0.868	0.890	0.896	0.902

Table 5.1 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
10	20	0	0.972	0.913	0.611	0.800	0.846	0.872	0.878	0.890	0.903	0.908	0.911
10	20	0.25	0.968	0.914	0.594	0.805	0.849	0.868	0.880	0.881	0.893	0.903	0.906
10	20	0.5	0.966	0.909	0.594	0.803	0.838	0.870	0.877	0.883	0.893	0.900	0.904
10	20	0.75	0.969	0.906	0.587	0.793	0.853	0.867	0.882	0.889	0.891	0.899	0.900
10	20	1	0.967	0.906	0.589	0.785	0.830	0.857	0.864	0.868	0.890	0.896	0.902
10	50	0	0.972	0.913	0.611	0.800	0.846	0.872	0.878	0.890	0.903	0.908	0.911
10	50	0.25	0.968	0.914	0.594	0.805	0.849	0.868	0.880	0.881	0.893	0.903	0.906
10	50	0.5	0.966	0.909	0.594	0.803	0.838	0.870	0.877	0.883	0.893	0.900	0.904
10	50	0.75	0.969	0.906	0.587	0.793	0.853	0.867	0.882	0.889	0.891	0.899	0.900
10	50	1	0.967	0.906	0.589	0.785	0.830	0.857	0.864	0.868	0.890	0.896	0.902
20	1	0	0.976	0.919	0.598	0.802	0.842	0.865	0.881	0.884	0.898	0.902	0.908
20	1	0.25	0.973	0.912	0.608	0.803	0.852	0.864	0.882	0.888	0.899	0.906	0.905
20	1	0.5	0.973	0.912	0.592	0.789	0.837	0.860	0.871	0.883	0.892	0.902	0.907
20	1	0.75	0.972	0.907	0.587	0.791	0.838	0.860	0.868	0.880	0.892	0.898	0.900
20	1	1	0.975	0.906	0.596	0.778	0.836	0.860	0.869	0.876	0.888	0.898	0.899
20	5	0	0.976	0.919	0.598	0.802	0.842	0.865	0.881	0.884	0.898	0.902	0.908
20	5	0.25	0.973	0.912	0.608	0.803	0.852	0.864	0.882	0.888	0.899	0.906	0.905
20	5	0.5	0.973	0.912	0.592	0.789	0.837	0.860	0.871	0.883	0.892	0.902	0.907
20	5	0.75	0.972	0.907	0.587	0.791	0.838	0.860	0.868	0.880	0.892	0.898	0.900
20	5	1	0.975	0.906	0.596	0.778	0.836	0.860	0.869	0.876	0.888	0.898	0.899
20	10	0	0.976	0.919	0.598	0.802	0.842	0.865	0.881	0.884	0.898	0.902	0.908
20	10	0.25	0.973	0.912	0.608	0.803	0.852	0.864	0.882	0.888	0.899	0.906	0.905
20	10	0.5	0.973	0.912	0.592	0.789	0.837	0.860	0.871	0.883	0.892	0.902	0.907
20	10	0.75	0.972	0.907	0.587	0.791	0.838	0.860	0.868	0.880	0.892	0.898	0.900
20	10	1	0.975	0.906	0.596	0.778	0.836	0.860	0.869	0.876	0.888	0.898	0.899
20	20	0	0.976	0.919	0.598	0.802	0.842	0.865	0.881	0.884	0.898	0.902	0.908
20	20	0.25	0.973	0.912	0.608	0.803	0.852	0.864	0.882	0.888	0.899	0.906	0.905
20	20	0.5	0.973	0.912	0.592	0.789	0.837	0.860	0.871	0.883	0.892	0.902	0.907
20	20	0.75	0.972	0.907	0.587	0.791	0.838	0.860	0.868	0.880	0.892	0.898	0.900
20	20	1	0.975	0.906	0.596	0.778	0.836	0.860	0.869	0.876	0.888	0.898	0.899

Table 5.1 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
20	50	0	0.976	0.919	0.598	0.802	0.842	0.865	0.881	0.884	0.898	0.902	0.908
20	50	0.25	0.973	0.912	0.608	0.803	0.852	0.864	0.882	0.888	0.899	0.906	0.905
20	50	0.5	0.973	0.912	0.592	0.789	0.837	0.860	0.871	0.883	0.892	0.902	0.907
20	50	0.75	0.972	0.907	0.587	0.791	0.838	0.860	0.868	0.880	0.892	0.898	0.900
20	50	1	0.975	0.906	0.596	0.778	0.836	0.860	0.869	0.876	0.888	0.898	0.899
50	1	0	0.977	0.905	0.596	0.799	0.846	0.859	0.866	0.873	0.886	0.889	0.896
50	1	0.25	0.973	0.904	0.598	0.795	0.845	0.862	0.869	0.871	0.885	0.889	0.892
50	1	0.5	0.975	0.906	0.597	0.792	0.842	0.855	0.868	0.871	0.878	0.893	0.891
50	1	0.75	0.972	0.898	0.596	0.796	0.836	0.848	0.859	0.870	0.879	0.881	0.887
50	1	1	0.976	0.904	0.588	0.782	0.839	0.862	0.866	0.881	0.887	0.889	0.894
50	5	0	0.977	0.905	596.000	0.799	0.846	0.859	0.866	0.873	0.886	0.889	0.896
50	5	0.25	0.973	0.904	0.598	0.795	0.845	0.862	0.869	0.871	0.885	0.889	0.892
50	5	0.5	0.975	0.906	0.597	0.793	0.842	0.855	0.868	0.871	0.878	0.893	0.891
50	5	0.75	0.972	0.898	0.596	0.796	0.836	0.848	0.859	0.870	0.879	0.881	0.887
50	5	1	0.976	0.904	0.588	0.782	0.839	0.862	0.866	0.881	0.887	0.889	0.894
50	10	0	0.977	0.905	0.596	0.799	0.846	0.859	0.866	0.873	0.886	0.889	0.896
50	10	0.25	0.973	0.904	0.598	0.795	0.845	0.862	0.869	0.871	0.885	0.889	0.892
50	10	0.5	0.975	0.906	0.597	0.793	0.842	0.855	0.868	0.871	0.878	0.893	0.891
50	10	0.75	0.972	0.898	0.596	0.796	0.836	0.848	0.859	0.870	0.879	0.881	0.887
50	10	1	0.976	0.904	0.588	0.782	0.839	0.862	0.866	0.881	0.887	0.889	0.894
50	20	0	0.977	0.905	0.596	0.799	0.846	0.859	0.866	0.873	0.886	0.889	0.896
50	20	0.25	0.973	0.904	0.598	0.795	0.845	0.862	0.869	0.871	0.885	0.889	0.892
50	20	0.5	0.975	0.906	0.597	0.793	0.842	0.855	0.868	0.871	0.878	0.893	0.891
50	20	0.75	0.972	0.898	0.596	0.796	0.836	0.848	0.859	0.870	0.879	0.881	0.887
50	20	1	0.976	0.904	0.588	0.782	0.839	0.862	0.866	0.881	0.887	0.889	0.894
50	50	0	0.977	0.905	0.596	0.799	0.846	0.859	0.866	0.873	0.886	0.889	0.896
50	50	0.25	0.973	0.904	0.598	0.795	0.845	0.862	0.869	0.871	0.885	0.889	0.892
50	50	0.5	0.975	0.906	0.597	0.793	0.842	0.855	0.868	0.871	0.878	0.893	0.891
50	50	0.75	0.972	0.898	0.596	0.796	0.836	0.848	0.859	0.870	0.879	0.881	0.887
50	50	1	0.976	0.904	0.588	0.782	0.839	0.862	0.866	0.881	0.887	0.889	0.894

Table 5.2: Coverage Probabilities of mean for Crack distribution n = 50 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
2	1	0	0.972	0.903	0.606	0.799	0.838	0.854	0.866	0.872	0.884	0.889	0.889
2	1	0.25	0.971	0.900	0.607	0.796	0.833	0.849	0.865	0.872	0.882	0.892	0.894
2	1	0.5	0.972	0.905	0.623	0.809	0.848	0.869	0.874	0.880	0.885	0.894	0.899
2	1	0.75	0.978	0.902	0.623	0.804	0.839	0.862	0.868	0.875	0.884	0.884	0.891
2	1	1	0.968	0.904	0.608	0.801	0.838	0.860	0.868	0.877	0.892	0.898	0.898
2	5	0	0.972	0.903	0.606	0.799	0.838	0.854	0.866	0.872	0.884	0.889	0.889
2	5	0.25	0.971	0.900	0.607	0.796	0.833	0.849	0.865	0.872	0.882	0.892	0.894
2	5	0.5	0.972	0.905	0.623	0.809	0.848	0.869	0.874	0.880	0.885	0.894	0.899
2	5	0.75	0.978	0.902	0.623	0.804	0.839	0.862	0.868	0.875	0.884	0.884	0.891
2	5	1	0.968	0.904	0.608	0.801	0.838	0.860	0.868	0.877	0.892	0.898	0.898
2	10	0	0.972	0.903	0.606	0.799	0.838	0.854	0.866	0.872	0.884	0.889	0.889
2	10	0.25	0.971	0.900	0.607	0.796	0.833	0.849	0.865	0.872	0.882	0.892	0.894
2	10	0.5	0.972	0.905	0.623	0.809	0.848	0.869	0.874	0.880	0.885	0.894	0.899
2	10	0.75	0.978	0.902	0.623	0.804	0.839	0.862	0.868	0.875	0.884	0.884	0.891
2	10	1	0.968	0.904	0.608	0.801	0.838	0.860	0.868	0.877	0.892	0.898	0.898
2	20	0	0.972	0.903	0.606	0.799	0.838	0.854	0.866	0.872	0.884	0.889	0.889
2	20	0.25	0.971	0.900	0.607	0.796	0.833	0.849	0.865	0.872	0.882	0.892	0.894
2	20	0.5	0.972	0.905	0.623	0.809	0.848	0.869	0.874	0.880	0.885	0.894	0.899
2	20	0.75	0.978	0.902	0.623	0.804	0.839	0.862	0.868	0.875	0.884	0.884	0.891
2	20	1	0.968	0.904	0.608	0.801	0.838	0.860	0.868	0.877	0.892	0.898	0.898
2	50	0	0.972	0.903	0.606	0.799	0.838	0.854	0.866	0.872	0.884	0.889	0.889
2	50	0.25	0.971	0.900	0.607	0.796	0.833	0.849	0.865	0.872	0.882	0.892	0.894
2	50	0.5	0.972	0.905	0.623	0.809	0.848	0.869	0.874	0.880	0.885	0.894	0.899
2	50	0.75	0.978	0.902	0.623	0.804	0.839	0.862	0.868	0.875	0.884	0.884	0.891
2	50	1	0.968	0.904	0.608	0.801	0.838	0.860	0.868	0.877	0.892	0.989	0.898
5	1	0	0.972	0.906	0.607	0.805	0.852	0.868	0.876	0.876	0.892	0.893	0.896
5	1	0.25	0.972	0.895	0.619	0.787	0.833	0.853	0.859	0.866	0.879	0.884	0.883
5	1	0.5	0.977	0.897	0.619	0.797	0.839	0.860	0.865	0.873	0.885	0.888	0.887
5	1	0.75	0.981	0.892	0.610	0.792	0.831	0.852	0.854	0.867	0.878	0.885	0.886
5	1	1	0.973	0.831	0.617	0.803	0.838	0.848	0.852	0.859	0.870	0.881	0.880

Table 5.2 (Cont.): Coverage Probabilities of mean for Crack distribution n = 50 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
5	5	0	0.972	0.906	0.607	0.805	0.852	0.868	0.876	0.876	0.892	0.893	0.896
5	5	0.25	0.972	0.895	0.619	0.787	0.833	0.853	0.859	0.866	0.879	0.884	0.883
5	5	0.5	0.977	0.897	0.619	0.797	0.839	0.860	0.865	0.873	0.885	0.888	0.887
5	5	0.75	0.981	0.892	0.610	0.792	0.831	0.852	0.854	0.867	0.878	0.885	0.886
5	5	1	0.973	0.891	0.617	0.803	0.838	0.848	0.852	0.859	0.870	0.881	0.880
5	10	0	0.972	0.906	0.607	0.805	0.852	0.868	0.876	0.876	0.892	0.893	0.896
5	10	0.25	0.972	0.895	0.619	0.787	0.833	0.853	0.859	0.866	0.879	0.884	0.883
5	10	0.5	0.977	0.897	0.619	0.797	0.839	0.860	0.865	0.873	0.885	0.888	0.887
5	10	0.75	0.981	0.892	0.610	0.792	0.831	0.852	0.854	0.867	0.878	0.885	0.886
5	10	1	0.973	0.891	0.617	0.803	0.838	0.848	0.852	0.859	0.870	0.881	0.880
5	20	0	0.972	0.906	0.607	0.805	0.852	0.868	0.876	0.876	0.892	0.893	0.896
5	20	0.25	0.972	0.895	0.619	0.787	0.833	0.853	0.859	0.866	0.879	0.884	0.883
5	20	0.5	0.977	0.897	0.619	0.797	0.839	0.860	0.865	0.873	0.885	0.888	0.887
5	20	0.75	0.981	0.892	0.610	0.792	0.831	0.852	0.854	0.867	0.878	0.885	0.886
5	20	1	0.973	0.891	0.617	0.803	0.838	0.848	0.852	0.859	0.870	0.881	0.880
5	50	0	0.972	0.906	0.607	0.805	0.852	0.868	0.876	0.876	0.892	0.893	0.896
5	50	0.25	0.972	0.895	0.619	0.787	0.833	0.853	0.859	0.866	0.879	0.884	0.883
5	50	0.5	0.977	0.897	0.619	0.797	0.839	0.860	0.865	0.873	0.885	0.888	0.887
5	50	0.75	0.981	0.892	0.610	0.792	0.831	0.852	0.854	0.867	0.878	0.885	0.886
5	50	1	0.973	0.891	0.617	0.803	0.838	0.848	0.852	0.859	0.870	0.881	0.880
10	1	0	0.980	0.909	0.606	0.798	0.832	0.850	0.871	0.875	0.888	0.902	0.903
10	1	0.25	0.985	0.900	0.605	0.782	0.831	0.849	0.858	0.873	0.880	0.886	0.893
10	1	0.5	0.980	0.911	0.608	0.771	0.829	0.853	0.864	0.875	0.886	0.902	0.903
10	1	0.75	0.982	0.908	0.607	0.783	0.833	0.848	0.863	0.869	0.884	0.892	0.896
10	1	1	0.981	0.900	0.618	0.774	0.826	0.849	0.860	0.868	0.884	0.892	0.894
10	5	0	0.980	0.909	0.606	0.798	0.832	0.850	0.871	0.875	0.888	0.902	0.903
10	5	0.25	0.985	0.900	0.605	0.782	0.831	0.849	0.858	0.873	0.880	0.886	0.893
10	5	0.5	0.980	0.911	0.608	0.771	0.829	0.853	0.864	0.875	0.886	0.902	0.903
10	5	0.75	0.982	0.908	0.607	0.783	0.833	0.848	0.863	0.869	0.884	0.892	0.896
10	5	1	0.981	0.900	0.618	0.774	0.826	0.849	0.860	0.868	0.884	0.892	0.894
10	10	0	0.980	0.909	0.606	0.798	0.832	0.850	0.871	0.875	0.888	0.902	0.903
10	10	0.25	0.985	0.900	0.605	0.782	0.831	0.849	0.858	0.873	0.880	0.886	0.893
10	10	0.5	0.980	0.911	0.608	0.771	0.829	0.853	0.864	0.875	0.886	0.902	0.903
10	10	0.75	0.982	0.908	0.607	0.783	0.833	0.848	0.863	0.869	0.884	0.892	0.896
10	10	1	0.981	0.900	0.618	0.774	0.826	0.849	0.860	0.868	0.884	0.892	0.894

Table 5.2 (Cont.): Coverage Probabilities of mean for Crack distribution n = 50 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
10	20	0	0.980	0.909	0.606	0.798	0.832	0.850	0.871	0.875	0.888	0.902	0.903
10	20	0.25	0.985	0.900	0.605	0.782	0.831	0.849	0.858	0.873	0.880	0.886	0.893
10	20	0.5	0.980	0.911	0.608	0.771	0.829	0.853	0.864	0.875	0.886	0.902	0.903
10	20	0.75	0.982	0.908	0.607	0.783	0.833	0.848	0.863	0.869	0.884	0.892	0.896
10	20	1	0.981	0.900	0.618	0.774	0.826	0.846	0.860	0.868	0.884	0.892	0.894
10	50	0	0.980	0.909	0.606	0.798	0.832	0.850	0.871	0.875	0.888	0.902	0.903
10	50	0.25	0.985	0.900	0.605	0.782	0.831	0.849	0.858	0.873	0.880	0.886	0.893
10	50	0.5	0.980	0.911	0.608	0.771	0.829	0.853	0.864	0.875	0.886	0.902	0.903
10	50	0.75	0.982	0.908	0.607	0.783	0.833	0.848	0.863	0.869	0.884	0.892	0.896
10	50	1	0.981	0.900	0.618	0.774	0.826	0.849	0.860	0.868	0.884	0.892	0.894
20	1	0	0.983	0.898	0.597	0.787	0.837	0.853	0.862	0.870	0.884	0.890	0.897
20	1	0.25	0.982	0.902	0.602	0.781	0.832	0.857	0.865	0.874	0.886	0.894	0.894
20	1	0.5	0.980	0.908	0.596	0.787	0.840	0.864	0.868	0.879	0.886	0.895	0.902
20	1	0.75	0.985	0.906	0.608	0.796	0.836	0.857	0.864	0.875	0.888	0.899	0.900
20	1	1	0.979	0.903	0.606	0.781	0.831	0.857	0.869	0.875	0.887	0.894	0.900
20	5	0	0.983	0.898	0.897	0.787	0.837	0.853	0.862	0.870	0.884	0.890	0.897
20	5	0.25	0.982	0.902	0.602	0.781	0.832	0.857	0.865	0.874	0.886	0.894	0.894
20	5	0.5	0.980	0.908	0.596	0.787	0.840	0.864	0.868	0.879	0.886	0.895	0.902
20	5	0.75	0.985	0.906	0.608	0.796	0.836	0.857	0.864	0.875	0.888	0.899	0.900
20	5	1	0.979	0.903	0.606	0.781	0.831	0.857	0.869	0.875	0.887	0.894	0.900
20	10	0	0.983	0.898	0.597	0.787	0.837	0.853	0.862	0.870	0.884	0.890	0.897
20	10	0.25	0.982	0.902	0.602	0.781	0.832	0.857	0.865	0.874	0.886	0.894	0.894
20	10	0.5	0.980	0.908	0.596	0.787	0.840	0.864	0.868	0.879	0.886	0.895	0.902
20	10	0.75	0.985	0.906	0.608	0.796	0.836	0.857	0.864	0.875	0.888	0.899	0.900
20	10	1	0.979	0.903	0.606	0.781	0.831	0.857	0.869	0.875	0.887	0.894	0.900
20	20	0	0.983	0.898	0.597	0.787	0.837	0.853	0.862	0.870	0.884	0.890	0.897
20	20	0.25	0.982	0.902	0.602	0.781	0.832	0.857	0.865	0.874	0.886	0.894	0.894
20	20	0.5	0.980	0.908	0.596	0.787	0.840	0.867	0.868	0.879	0.886	0.895	0.902
20	20	0.75	0.985	0.906	0.608	0.796	0.836	0.857	0.864	0.875	0.888	0.899	0.900
20	20	1	0.979	0.903	0.606	0.781	0.831	0.857	0.869	0.875	0.887	0.894	0.900

Table 5.2 (Cont.): Coverage Probabilities of mean for Crack distribution n = 50 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
20	50	0	0.983	0.898	0.597	0.787	0.837	0.853	0.862	0.870	0.884	0.890	0.897
20	50	0.25	0.982	0.902	0.602	0.781	0.832	0.857	0.865	0.874	0.886	0.894	0.894
20	50	0.5	0.980	0.908	0.596	0.787	0.840	0.864	0.868	0.879	0.886	0.895	0.902
20	50	0.75	0.985	0.906	0.608	0.796	0.836	0.857	0.864	0.875	0.888	0.899	0.900
20	50	1	0.979	0.903	0.606	0.781	0.831	0.857	0.869	0.875	0.887	0.894	0.900
50	1	0	0.979	0.906	0.614	0.789	0.849	0.866	0.872	0.874	0.895	0.900	0.906
50	1	0.25	0.978	0.900	0.610	0.790	0.846	0.861	0.870	0.873	0.887	0.894	0.894
50	1	0.5	0.978	0.908	0.608	0.792	0.848	0.862	0.872	0.875	0.891	0.899	0.896
50	1	0.75	0.977	0.908	0.616	0.796	0.838	0.857	0.868	0.873	0.888	0.900	0.902
50	1	1	0.979	0.906	0.608	0.792	0.841	0.853	0.865	0.866	0.888	0.898	0.899
50	5	0	0.979	0.906	0.614	0.789	0.849	0.866	0.872	0.874	0.895	0.900	0.906
50	5	0.25	0.978	0.900	0.610	0.790	0.846	0.861	0.870	0.873	0.887	0.894	0.894
50	5	0.5	0.978	0.908	0.608	0.792	0.848	0.862	0.872	0.875	0.891	0.899	0.896
50	5	0.75	0.977	0.908	0.616	0.796	0.838	0.857	0.868	0.873	0.888	0.900	0.902
50	5	1	0.979	0.906	0.608	0.792	0.841	0.853	0.865	0.866	0.888	0.898	0.899
50	10	0	0.979	0.906	0.614	0.789	0.849	0.866	0.872	0.874	0.895	0.900	0.906
50	10	0.25	0.978	0.900	0.610	0.790	0.846	0.861	0.870	0.873	0.887	0.894	0.894
50	10	0.5	0.978	0.908	0.608	0.792	0.848	0.862	0.872	0.875	0.891	0.899	0.896
50	10	0.75	0.977	0.908	0.616	0.796	0.838	0.857	0.868	0.873	0.888	0.900	0.902
50	10	1	0.979	0.906	0.608	0.792	0.841	0.853	0.865	0.866	0.888	0.898	0.899
50	20	0	0.979	0.906	0.614	0.789	0.849	0.866	0.872	0.874	0.895	0.900	0.906
50	20	0.25	0.978	0.900	0.610	0.790	0.846	0.861	0.870	0.873	0.887	0.894	0.894
50	20	0.5	0.978	0.908	0.608	0.792	0.848	0.862	0.872	0.875	0.891	0.899	0.896
50	20	0.75	0.977	0.908	0.616	0.796	0.838	0.857	0.868	0.873	0.888	0.900	0.902
50	20	1	0.979	0.906	0.608	0.792	0.841	0.853	0.868	0.866	0.888	0.898	0.899
50	50	0	0.979	0.906	0.614	0.789	0.849	0.866	0.872	0.874	0.895	0.900	0.906
50	50	0.25	0.978	0.900	0.610	0.790	0.846	0.861	0.870	0.873	0.887	0.894	0.894
50	50	0.5	0.978	0.908	0.608	0.792	0.848	0.862	0.872	0.875	0.891	0.899	0.896
50	50	0.75	0.977	0.908	0.616	0.796	0.838	0.857	0.868	0.873	0.888	0.900	0.902
50	50	1	0.979	0.906	0.608	0.792	0.841	0.853	0.865	0.866	0.888	0.898	0.899

Table 5.3: Coverage Probabilities of mean for Crack distribution n = 100 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
2	1	0	0.981	0.912	0.612	0.796	0.850	0.863	0.881	0.894	0.900	0.911	0.915
2	1	0.25	0.979	0.906	0.610	0.793	0.846	0.861	0.880	0.882	0.893	0.899	0.898
2	1	0.5	0.977	0.909	0.601	0.792	0.845	0.862	0.867	0.879	0.894	0.896	0.904
2	1	0.75	0.974	0.907	0.603	0.779	0.835	0.849	0.862	0.868	0.887	0.896	0.900
2	1	1	0.982	0.904	0.593	0.785	0.837	0.854	0.863	0.865	0.879	0.888	0.895
2	5	0	0.981	0.912	0.612	0.796	0.850	0.863	0.881	0.894	0.900	0.911	0.915
2	5	0.25	0.979	0.906	0.610	0.793	0.846	0.861	0.880	0.882	0.893	0.899	0.898
2	5	0.5	0.977	0.909	0.601	0.792	0.845	0.862	0.867	0.879	0.894	0.896	0.904
2	5	0.75	0.974	0.907	0.603	0.779	0.835	0.849	0.862	0.868	0.887	0.896	0.900
2	5	1	0.982	0.904	0.593	0.785	0.837	0.854	0.863	0.865	0.879	0.888	0.895
2	10	0	0.981	0.912	0.612	0.796	0.850	0.863	0.881	0.894	0.900	0.911	0.915
2	10	0.25	0.979	0.906	0.610	0.793	0.846	0.861	0.880	0.882	0.893	0.899	0.898
2	10	0.5	0.977	0.909	0.601	0.792	0.845	0.862	0.867	0.879	0.894	0.896	0.904
2	10	0.75	0.974	0.907	0.603	0.779	0.835	0.849	0.862	0.868	0.887	0.896	0.900
2	10	1	0.982	0.904	0.593	0.785	0.837	0.854	0.863	0.865	0.879	0.888	0.895
2	20	0	0.981	0.912	0.612	0.796	0.850	0.863	0.881	0.894	0.900	0.911	0.915
2	20	0.25	0.979	0.906	0.610	0.793	0.846	0.861	0.880	0.882	0.893	0.899	0.898
2	20	0.5	0.977	0.909	0.601	0.792	0.845	0.862	0.867	0.879	0.894	0.896	0.904
2	20	0.75	0.974	0.907	0.603	0.779	0.835	0.849	0.862	0.868	0.887	0.896	0.900
2	20	1	0.982	0.904	0.593	0.785	0.837	0.854	0.863	0.865	0.879	0.888	0.895
2	50	0	0.981	0.912	0.612	0.796	0.850	0.863	0.881	0.894	0.900	0.911	0.915
2	50	0.25	0.979	0.906	0.610	0.793	0.846	0.861	0.880	0.882	0.893	0.899	0.898
2	50	0.5	0.977	0.909	0.601	0.792	0.845	0.862	0.867	0.879	0.894	0.896	0.904
2	50	0.75	0.974	0.907	0.603	0.779	0.835	0.849	0.862	0.868	0.887	0.896	0.900
2	50	1	0.982	0.904	0.593	0.785	0.837	0.854	0.863	0.865	0.879	0.888	0.895
5	1	0	0.983	0.918	0.619	0.815	0.866	0.879	0.889	0.893	0.904	0.911	0.915
5	1	0.25	0.982	0.919	0.601	0.829	0.860	0.874	0.887	0.891	0.904	0.912	0.915
5	1	0.5	0.981	0.928	0.586	0.819	0.865	0.882	0.892	0.903	0.913	0.919	0.924
5	1	0.75	0.981	0.915	0.605	0.807	0.855	0.869	0.881	0.883	0.894	0.907	0.912
5	1	1	0.980	0.906	0.610	0.818	0.863	0.875	0.883	0.888	0.893	0.901	0.900

Table 5.3 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
5	5	0	0.983	0.918	0.619	0.815	0.866	0.879	0.889	0.893	0.904	0.911	0.915
5	5	0.25	0.982	0.919	0.601	0.829	0.860	0.874	0.887	0.891	0.904	0.912	0.915
5	5	0.5	0.981	0.928	0.586	0.819	0.865	0.882	0.892	0.903	0.913	0.919	0.924
5	5	0.75	0.981	0.915	0.605	0.807	0.855	0.869	0.881	0.883	0.894	0.907	0.912
5	5	1	0.980	0.906	0.610	0.818	0.863	0.875	0.883	0.888	0.893	0.901	0.900
5	10	0	0.983	0.918	0.619	0.815	0.866	0.879	0.889	0.893	0.904	0.911	0.915
5	10	0.25	0.982	0.919	0.601	0.829	0.860	0.874	0.887	0.891	0.904	0.912	0.915
5	10	0.5	0.981	0.928	0.586	0.819	0.865	0.882	0.892	0.903	0.913	0.919	0.924
5	10	0.75	0.981	0.915	0.605	0.807	0.855	0.869	0.881	0.883	0.894	0.907	0.912
5	10	1	0.980	0.906	0.610	0.818	0.863	0.875	0.883	0.888	0.893	0.901	0.900
5	20	0	0.983	0.918	0.619	0.815	0.866	0.879	0.889	0.893	0.904	0.911	0.915
5	20	0.25	0.982	0.919	0.601	0.829	0.860	0.874	0.887	0.891	0.904	0.912	0.915
5	20	0.5	0.981	0.928	0.586	0.819	0.865	0.882	0.892	0.903	0.913	0.919	0.924
5	20	0.75	0.981	0.915	0.605	0.807	0.855	0.869	0.881	0.883	0.894	0.907	0.912
5	20	1	0.980	0.906	0.610	0.818	0.863	0.875	0.883	0.888	0.893	0.901	0.900
5	50	0	0.983	0.918	0.619	0.815	0.866	0.879	0.889	0.893	0.904	0.911	0.915
5	50	0.25	0.982	0.919	0.601	0.829	0.860	0.874	0.887	0.891	0.904	0.912	0.915
5	50	0.5	0.981	0.928	0.586	0.819	0.865	0.882	0.892	0.903	0.913	0.919	0.924
5	50	0.75	0.981	0.915	0.605	0.807	0.855	0.869	0.881	0.883	0.894	0.907	0.912
5	50	1	0.980	0.906	0.610	0.818	0.863	0.875	0.883	0.888	0.893	0.901	0.900
10	1	0	0.986	0.921	0.609	0.818	0.859	0.884	0.888	0.896	0.904	0.914	0.913
10	1	0.25	0.981	0.913	0.606	0.807	0.853	0.869	0.882	0.884	0.896	0.906	0.904
10	1	0.5	0.984	0.915	0.607	0.804	0.854	0.874	0.887	0.890	0.899	0.906	0.907
10	1	0.75	0.982	0.906	0.615	0.801	0.852	0.867	0.883	0.888	0.902	0.905	0.902
10	1	1	0.982	0.921	0.598	0.788	0.847	0.866	0.885	0.889	0.905	0.915	0.913
10	5	0	0.986	0.921	0.609	0.818	0.859	0.884	0.888	0.896	0.904	0.914	0.913
10	5	0.25	0.981	0.913	0.606	0.807	0.853	0.869	0.882	0.884	0.896	0.906	0.904
10	5	0.5	0.984	0.915	0.607	0.804	0.854	0.874	0.887	0.890	0.899	0.906	0.907
10	5	0.75	0.982	0.906	0.615	0.801	0.852	0.867	0.883	0.888	0.902	0.905	0.902
10	5	1	0.982	0.921	0.598	0.788	0.847	0.866	0.885	0.889	0.905	0.915	0.913
10	10	0	0.986	0.921	0.609	0.818	0.859	0.884	0.888	0.896	0.904	0.914	0.913
10	10	0.25	0.981	0.913	0.605	0.807	0.853	0.869	0.882	0.884	0.896	0.906	0.904
10	10	0.5	0.984	0.915	0.607	0.804	0.854	0.874	0.887	0.890	0.899	0.906	0.907
10	10	0.75	0.982	0.906	0.615	0.801	0.852	0.867	0.883	0.888	0.902	0.905	0.902
10	10	1	0.982	0.921	0.598	0.788	0.847	0.866	0.885	0.889	0.905	0.915	0.913

Table 5.3 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
10	20	0	0.986	0.921	0.609	0.818	0.859	0.884	0.888	0.896	0.904	0.914	0.913
10	20	0.25	0.981	0.913	0.605	0.807	0.853	0.869	0.882	0.884	0.896	0.906	0.904
10	20	0.5	0.984	0.915	0.607	0.804	0.854	0.874	0.887	0.890	0.899	0.906	0.907
10	20	0.75	0.982	0.906	0.615	0.801	0.852	0.867	0.883	0.888	0.902	0.905	0.902
10	20	1	0.982	0.921	0.598	0.788	0.847	0.866	0.885	0.889	0.905	0.915	0.913
10	50	0	0.986	0.921	0.609	0.818	0.859	0.884	0.888	0.896	0.904	0.914	0.913
10	50	0.25	0.981	0.913	0.605	0.807	0.853	0.869	0.882	0.884	0.896	0.906	0.904
10	50	0.5	0.984	0.915	0.607	0.804	0.854	0.874	0.887	0.890	0.899	0.906	0.907
10	50	0.75	0.982	0.906	0.615	0.801	0.852	0.867	0.883	0.888	0.902	0.905	0.902
10	50	1	0.982	0.921	0.598	0.788	0.847	0.866	0.885	0.889	0.905	0.915	0.913
20	1	0	0.986	0.916	0.596	0.795	0.845	0.868	0.879	0.887	0.899	0.907	0.909
20	1	0.25	0.983	0.911	0.603	0.794	0.834	0.858	0.869	0.883	0.890	0.901	0.904
20	1	0.5	0.982	0.912	0.613	0.788	0.837	0.856	0.869	0.876	0.887	0.901	0.897
20	1	0.75	0.980	0.911	0.606	0.788	0.842	0.855	0.868	0.877	0.891	0.889	0.897
20	1	1	0.980	0.911	0.593	0.784	0.841	0.866	0.876	0.881	0.896	0.905	0.904
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20	5	0.25	0.983	0.911	0.603	0.794	0.834	0.858	0.869	0.883	0.890	0.901	0.904
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20	5	0.75	0.980	0.911	0.606	0.788	0.842	0.855	0.868	0.877	0.891	0.889	0.897
20	5	1	0.980	0.911	0.593	0.784	0.841	0.866	0.876	0.881	0.896	0.905	0.904
20	10	0	0.986	0.916	0.596	0.795	0.845	0.868	0.879	0.887	0.899	0.907	0.909
20	10	0.25	0.983	0.911	0.603	0.794	0.834	0.858	0.869	0.883	0.890	0.901	0.904
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20	20	0	0.986	0.916	0.596	0.795	0.845	0.868	0.879	0.887	0.899	0.907	0.909
20	20	0.25	0.983	0.911	0.603	0.794	0.834	0.858	0.869	0.883	0.890	0.901	0.904
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20	20	0.75	0.980	0.911	0.606	0.788	0.842	0.855	0.868	0.877	0.891	0.889	0.897
20	20	1	0.980	0.911	0.593	0.784	0.841	0.866	0.876	0.881	0.896	0.905	0.904

Table 5.3 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
20	50	0	0.986	0.916	0.596	0.795	0.845	0.868	0.879	0.887	0.899	0.907	0.909
20	50	0.25	0.983	0.911	0.603	0.794	0.834	0.858	0.869	0.883	0.890	0.901	0.904
20	50	0.5	0.982	0.912	0.613	0.788	0.837	0.856	0.869	0.876	0.887	0.901	0.897
20	50	0.75	0.980	0.911	0.606	0.788	0.842	0.855	0.868	0.877	0.891	0.889	0.897
20	50	1	0.980	0.911	0.593	0.784	0.841	0.866	0.876	0.881	0.896	0.905	0.904
50	1	0	0.985	0.917	0.600	0.793	0.846	0.865	0.880	0.886	0.894	0.904	0.901
50	1	0.25	0.987	0.910	0.601	0.786	0.838	0.857	0.870	0.873	0.891	0.895	0.898
50	1	0.5	0.987	0.907	0.593	0.789	0.841	0.856	0.868	0.877	0.890	0.894	0.896
50	1	0.75	0.983	0.916	0.608	0.780	0.839	0.857	0.874	0.880	0.895	0.903	0.908
50	1	1	0.982	0.909	0.593	0.787	0.836	0.857	0.872	0.878	0.892	0.896	0.900
50	5	0	0.985	0.917	0.600	0.793	0.846	0.865	0.880	0.886	0.894	0.904	0.901
50	5	0.25	0.987	0.910	0.601	0.786	0.838	0.857	0.870	0.873	0.891	0.895	0.898
50	5	0.5	0.987	0.907	0.593	0.789	0.841	0.856	0.868	0.877	0.890	0.894	0.896
50	5	0.75	0.983	0.916	0.608	0.780	0.839	0.857	0.874	0.880	0.895	0.903	0.908
50	5	1	0.982	0.909	0.593	0.787	0.836	0.857	0.872	0.878	0.892	0.896	0.900
50	10	0	0.985	0.917	0.600	0.979	0.846	0.865	0.880	0.886	0.894	0.904	0.901
50	10	0.25	0.987	0.910	0.601	0.786	0.838	0.857	0.870	0.873	0.891	0.895	0.898
50	10	0.5	0.987	0.907	0.593	0.789	0.841	0.856	0.868	0.877	0.890	0.894	0.896
50	10	0.75	0.983	0.916	0.608	0.780	0.839	0.857	0.874	0.880	0.895	0.903	0.908
50	10	1	0.982	0.909	0.593	0.787	0.836	0.857	0.872	0.878	0.892	0.896	0.900
50	20	0	0.985	0.917	0.600	0.793	0.846	0.865	0.880	0.886	0.894	0.904	0.901
50	20	0.25	0.987	0.910	0.601	0.786	0.838	0.857	0.870	0.873	0.891	0.895	0.898
50	20	0.5	0.987	0.907	0.593	0.789	0.841	0.856	0.868	0.877	0.890	0.894	0.896
50	20	0.75	0.983	0.916	0.608	0.780	0.839	0.857	0.874	0.880	0.895	0.903	0.908
50	20	1	0.982	0.909	0.593	0.787	0.836	0.857	0.872	0.878	0.892	0.896	0.900
50	50	0	0.985	0.917	0.600	0.793	0.846	0.865	0.880	0.886	0.894	0.904	0.901
50	50	0.25	0.987	0.910	0.601	0.786	0.838	0.857	0.870	0.873	0.891	0.895	0.898
50	50	0.5	0.987	0.907	0.593	0.789	0.841	0.856	0.868	0.877	0.890	0.894	0.896
50	50	0.75	0.983	0.916	0.608	0.780	0.839	0.857	0.874	0.880	0.895	0.903	0.908
50	50	1	0.982	0.909	0.593	0.787	0.836	0.857	0.872	0.878	0.892	0.896	0.900

Table 5.4: Coverage Probabilities of mean for Crack distribution n = 10 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
2	1	0	0.951	0.863	0.727	0.817	0.833	0.842	0.850	0.848	0.852	0.860	0.865
2	1	0.25	0.952	0.864	0.739	0.812	0.841	0.848	0.851	0.858	0.858	0.862	0.867
2	1	0.5	0.948	0.868	0.724	0.815	0.836	0.843	0.853	0.854	0.864	0.861	0.873
2	1	0.75	0.940	0.853	0.723	0.802	0.823	0.832	0.832	0.832	0.845	0.844	0.847
2	1	1	0.929	0.840	0.715	0.803	0.818	0.826	0.826	0.829	0.838	0.838	0.839
2	5	0	0.951	0.863	0.727	0.817	0.833	0.842	0.850	0.848	0.852	0.860	0.865
2	5	0.25	0.952	0.864	0.739	0.812	0.841	0.848	0.851	0.858	0.858	0.862	0.867
2	5	0.5	0.948	0.868	0.824	0.815	0.836	0.843	0.853	0.854	0.864	0.861	0.873
2	5	0.75	0.940	0.853	0.723	0.802	0.823	0.832	0.832	0.832	0.845	0.844	0.847
2	5	1	0.929	0.840	0.715	0.803	0.818	0.826	0.826	0.829	0.838	0.838	0.839
2	10	0	0.951	0.863	0.727	0.817	0.833	0.842	0.850	0.848	0.852	0.860	0.865
2	10	0.25	0.952	0.864	0.739	0.812	0.841	0.848	0.851	0.858	0.858	0.862	0.867
2	10	0.5	0.948	0.868	0.724	0.815	0.836	0.843	0.853	0.854	0.864	0.861	0.873
2	10	0.75	0.940	0.853	0.723	0.802	0.823	0.832	0.832	0.832	0.845	0.844	0.847
2	10	1	0.929	0.840	0.715	0.809	0.818	0.826	0.826	0.829	0.838	0.838	0.839
2	20	0	0.951	0.863	0.727	0.817	0.833	0.842	0.850	0.848	0.852	0.860	0.865
2	20	0.25	0.952	0.864	0.739	0.812	0.841	0.848	0.851	0.858	0.858	0.862	0.867
2	20	0.5	0.948	0.868	0.724	0.815	0.836	0.843	0.853	0.854	0.864	0.861	0.873
2	20	0.75	0.940	0.853	0.723	0.802	0.823	0.832	0.832	0.832	0.845	0.844	0.847
2	20	1	0.929	0.840	0.715	0.803	0.818	0.826	0.826	0.829	0.838	0.838	0.839
2	50	0	0.951	0.863	0.727	0.817	0.833	0.842	0.850	0.848	0.852	0.860	0.865
2	50	0.25	0.952	0.864	0.739	0.812	0.841	0.848	0.851	0.858	0.858	0.862	0.867
2	50	0.5	0.948	0.868	0.724	0.815	0.836	0.843	0.853	0.854	0.864	0.861	0.873
2	50	0.75	0.940	0.853	0.723	0.802	0.823	0.832	0.832	0.832	0.845	0.844	0.847
2	50	1	0.929	0.840	0.715	0.803	0.818	0.826	0.826	0.829	0.838	0.838	0.839
5	1	0	0.963	0.874	0.754	0.833	0.850	0.852	0.858	0.859	0.865	0.866	0.870
5	1	0.25	0.966	0.879	0.736	0.823	0.845	0.848	0.859	0.856	0.866	0.872	0.868
5	1	0.5	0.969	0.884	0.719	0.819	0.843	0.852	0.862	0.867	0.869	0.873	0.876
5	1	0.75	0.962	0.883	0.725	0.827	0.848	0.857	0.868	0.869	0.874	0.874	0.882
5	1	1	0.959	0.867	0.730	0.811	0.832	0.843	0.844	0.848	0.858	0.863	0.868

Table 5.4 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
5	5	0	0.963	0.874	0.754	0.833	0.850	0.852	0.858	0.859	0.865	0.866	0.870
5	5	0.25	0.966	0.879	0.736	0.823	0.845	0.848	0.859	0.856	0.866	0.872	0.868
5	5	0.5	0.969	0.884	0.719	0.819	0.843	0.852	0.862	0.867	0.869	0.873	0.876
5	5	0.75	0.962	0.883	0.725	0.827	0.848	0.857	0.868	0.869	0.874	0.874	0.882
5	5	1	0.959	0.867	0.730	0.811	0.832	0.843	0.844	0.848	0.858	0.863	0.868
5	10	0	0.963	0.874	0.754	0.833	0.850	0.852	0.858	0.859	0.865	0.866	0.870
5	10	0.25	0.966	0.879	0.736	0.823	0.845	0.848	0.859	0.856	0.866	0.872	0.868
5	10	0.5	0.969	0.884	0.719	0.819	0.843	0.852	0.862	0.867	0.869	0.873	0.876
5	10	0.75	0.962	0.883	0.725	0.827	0.848	0.857	0.868	0.869	0.874	0.874	0.882
5	10	1	0.959	0.867	0.730	0.811	0.832	0.843	0.844	0.848	0.858	0.863	0.868
5	20	0	0.963	0.874	0.754	0.833	0.850	0.852	0.858	0.859	0.865	0.866	0.870
5	20	0.25	0.966	0.879	0.736	0.823	0.845	0.848	0.859	0.856	0.866	0.872	0.868
5	20	0.5	0.969	0.884	0.719	0.819	0.843	0.852	0.862	0.867	0.869	0.873	0.876
5	20	0.75	0.962	0.883	0.725	0.827	0.848	0.857	0.868	0.869	0.874	0.874	0.882
5	20	1	0.959	0.867	0.730	0.811	0.832	0.843	0.844	0.848	0.858	0.863	0.868
5	50	0	0.963	0.874	0.754	0.833	0.850	0.852	0.858	0.859	0.865	0.866	0.870
5	50	0.25	0.966	0.879	0.736	0.823	0.845	0.848	0.859	0.856	0.866	0.872	0.868
5	50	0.5	0.969	0.884	0.719	0.819	0.843	0.852	0.862	0.867	0.869	0.873	0.876
5	50	0.75	0.962	0.883	0.725	0.827	0.848	0.857	0.868	0.869	0.874	0.874	0.882
5	50	1	0.959	0.867	0.730	0.811	0.832	0.843	0.844	0.848	0.858	0.863	0.868
10	1	0	0.972	0.885	0.735	0.826	0.846	0.860	0.869	0.873	0.880	0.882	0.885
10	1	0.25	0.968	0.881	0.733	0.832	0.854	0.856	0.863	0.865	0.880	0.878	0.881
10	1	0.5	0.966	0.876	0.726	0.810	0.842	0.846	0.858	0.861	0.868	0.868	0.872
10	1	0.75	0.969	0.876	0.720	0.817	0.841	0.845	0.856	0.858	0.868	0.869	0.869
10	1	1	0.967	0.880	0.711	0.810	0.835	0.839	0.850	0.851	0.865	0.867	0.873
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10	5	0.5	0.966	0.876	0.726	0.810	0.842	0.846	0.858	0.861	0.868	0.868	0.872
10	5	0.75	0.969	0.876	0.720	0.817	0.841	0.845	0.856	0.858	0.868	0.869	0.869
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10	10	0	0.972	0.885	0.735	0.826	0.846	0.860	0.869	0.873	0.880	0.882	0.885
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10	10	0.75	0.969	0.876	0.720	0.817	0.841	0.845	0.856	0.858	0.868	0.869	0.869
10	10	1	0.967	0.880	0.711	0.810	0.835	0.839	0.850	0.851	0.865	0.867	0.873

Table 5.4 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
10	20	0	0.972	0.885	0.735	0.826	0.846	0.860	0.869	0.873	0.880	0.882	0.885
10	20	0.25	0.968	0.881	0.733	0.832	0.854	0.856	0.863	0.865	0.880	0.878	0.881
10	20	0.5	0.966	0.876	0.726	0.810	0.842	0.846	0.858	0.861	0.868	0.868	0.872
10	20	0.75	0.969	0.876	0.720	0.817	0.841	0.845	0.856	0.858	0.868	0.869	0.869
10	20	1	0.967	0.880	0.711	0.810	0.835	0.839	0.850	0.851	0.865	0.867	0.873
10	50	0	0.972	0.885	0.735	0.826	0.846	0.860	0.869	0.873	0.880	0.882	0.885
10	50	0.25	0.968	0.881	0.733	0.832	0.854	0.856	0.863	0.865	0.880	0.878	0.881
10	50	0.5	0.966	0.876	0.726	0.810	0.842	0.846	0.858	0.861	0.868	0.868	0.872
10	50	0.75	0.969	0.876	0.720	0.817	0.841	0.845	0.856	0.858	0.868	0.869	0.869
10	50	1	0.967	0.880	0.711	0.810	0.835	0.839	0.850	0.851	0.865	0.867	0.873
20	1	0	0.976	0.884	0.731	0.829	0.846	0.857	0.858	0.867	0.873	0.876	0.877
20	1	0.25	0.973	0.881	0.735	0.826	0.854	0.860	0.863	0.870	0.879	0.879	0.876
20	1	0.5	0.973	0.874	0.725	0.816	0.843	0.851	0.854	0.862	0.870	0.869	0.871
20	1	0.75	0.972	0.872	0.728	0.817	0.833	0.845	0.852	0.852	0.862	0.866	0.866
20	1	1	0.975	0.876	0.711	0.813	0.839	0.849	0.853	0.861	0.870	0.875	0.877
20	5	0	0.976	0.884	0.731	0.829	0.846	0.857	0.858	0.867	0.873	0.876	0.877
20	5	0.25	0.973	0.881	0.735	0.826	0.854	0.860	0.863	0.870	0.879	0.879	0.876
20	5	0.5	0.973	0.874	0.725	0.816	0.843	0.851	0.854	0.862	0.870	0.869	0.871
20	5	0.75	0.972	0.872	0.728	0.817	0.833	0.845	0.852	0.852	0.862	0.866	0.866
20	5	1	0.975	0.876	0.711	0.813	0.839	0.849	0.853	0.861	0.870	0.875	0.877
20	10	0	0.976	0.884	0.731	0.829	0.846	0.857	0.858	0.867	0.873	0.876	0.877
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20	10	0.5	0.973	0.874	0.725	0.816	0.843	0.851	0.854	0.862	0.870	0.869	0.871
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20	20	0.5	0.973	0.874	0.725	0.816	0.843	0.851	0.854	0.862	0.870	0.869	0.871
20	20	0.75	0.972	0.872	0.728	0.817	0.833	0.845	0.852	0.852	0.862	0.866	0.866
20	20	1	0.975	0.876	0.711	0.813	0.839	0.849	0.853	0.861	0.870	0.875	0.877

Table 5.4 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
20	50	0	0.976	0.884	0.731	0.829	0.846	0.857	0.858	0.867	0.873	0.876	0.877
20	50	0.25	0.973	0.881	0.735	0.826	0.854	0.860	0.863	0.870	0.879	0.879	0.876
20	50	0.5	0.973	0.874	0.725	0.816	0.843	0.851	0.854	0.862	0.870	0.869	0.871
20	50	0.75	0.972	0.872	0.728	0.817	0.833	0.845	0.852	0.852	0.862	0.866	0.866
20	50	1	0.975	0.876	0.711	0.813	0.839	0.849	0.853	0.861	0.870	0.875	0.877
50	1	0	0.977	0.875	0.736	0.820	0.843	0.853	0.859	0.863	0.868	0.867	0.871
50	1	0.25	0.973	0.876	0.733	0.827	0.849	0.857	0.860	0.864	0.865	0.869	0.874
50	1	0.5	0.975	0.880	0.718	0.820	0.837	0.855	0.855	0.861	0.874	0.866	0.874
50	1	0.75	0.972	0.872	0.724	0.815	0.833	0.843	0.849	0.852	0.863	0.862	0.869
50	1	1	0.976	0.875	0.715	0.816	0.841	0.849	0.853	0.857	0.868	0.869	0.873
50	5	0	0.977	0.875	0.736	0.820	0.843	0.853	0.859	0.863	0.868	0.867	0.871
50	5	0.25	0.973	0.876	0.733	0.827	0.849	0.857	0.860	0.864	0.865	0.869	0.874
50	5	0.5	0.975	0.880	0.718	0.820	0.837	0.855	0.855	0.861	0.874	0.866	0.874
50	5	0.75	0.972	0.872	0.724	0.815	0.833	0.843	0.849	0.852	0.863	0.862	0.869
50	5	1	0.976	0.875	0.715	0.816	0.841	0.849	0.853	0.857	0.868	0.869	0.873
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50	10	0.25	0.973	0.876	0.733	0.827	0.849	0.857	0.860	0.864	0.865	0.869	0.874
50	10	0.5	0.975	0.880	0.718	0.820	0.837	0.855	0.855	0.861	0.874	0.866	0.874
50	10	0.75	0.972	0.872	0.724	0.815	0.833	0.843	0.849	0.852	0.863	0.862	0.869
50	10	1	0.976	0.875	0.715	0.816	0.841	0.849	0.853	0.857	0.868	0.869	0.873
50	20	0	0.977	0.875	0.736	0.820	0.843	0.853	0.859	0.863	0.868	0.867	0.871
50	20	0.25	0.973	0.876	0.733	0.827	0.849	0.857	0.860	0.864	0.865	0.869	0.874
50	20	0.5	0.975	0.880	0.718	0.820	0.837	0.855	0.855	0.861	0.874	0.866	0.874
50	20	0.75	0.972	0.872	0.724	0.815	0.833	0.843	0.849	0.852	0.863	0.862	0.869
50	20	1	0.976	0.875	0.715	0.816	0.841	0.849	0.853	0.857	0.868	0.869	0.873
50	50	0	0.977	0.875	0.736	0.820	0.843	0.853	0.859	0.863	0.868	0.867	0.871
50	50	0.25	0.973	0.876	0.733	0.827	0.849	0.857	0.860	0.864	0.865	0.869	0.874
50	50	0.5	0.975	0.880	0.718	0.820	0.837	0.855	0.855	0.861	0.874	0.866	0.874
50	50	0.75	0.972	0.872	0.724	0.815	0.833	0.843	0.849	0.852	0.863	0.862	0.869
50	50	1	0.976	0.875	0.715	0.816	0.841	0.849	0.853	0.857	0.868	0.869	0.873

Table 5.5: Coverage Probabilities of mean for Crack distribution n = 50 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
2	1	0	0.972	0.889	0.759	0.840	0.864	0.872	0.874	0.877	0.883	0.886	0.886
2	1	0.25	0.971	0.883	0.760	0.844	0.861	0.863	0.870	0.873	0.874	0.883	0.882
2	1	0.5	0.972	0.885	0.766	0.842	0.860	0.867	0.871	0.875	0.880	0.885	0.887
2	1	0.75	0.978	0.892	0.761	0.839	0.861	0.864	0.869	0.877	0.881	0.887	0.884
2	1	1	0.968	0.895	0.767	0.849	0.866	0.874	0.878	0.885	0.887	0.892	0.895
2	5	0	0.972	0.889	0.759	0.840	0.864	0.872	0.874	0.877	0.883	0.886	0.886
2	5	0.25	0.971	0.883	0.760	0.844	0.861	0.863	0.870	0.873	0.874	0.883	0.882
2	5	0.5	0.972	0.885	0.766	0.842	0.860	0.867	0.871	0.875	0.880	0.885	0.887
2	5	0.75	0.978	0.892	0.761	0.839	0.861	0.864	0.869	0.877	0.881	0.887	0.884
2	5	1	0.968	0.895	0.767	0.849	0.866	0.874	0.878	0.885	0.887	0.892	0.895
2	10	0	0.972	0.889	0.759	0.840	0.864	0.872	0.874	0.877	0.883	0.886	0.886
2	10	0.25	0.971	0.883	0.760	0.844	0.861	0.863	0.870	0.873	0.874	0.883	0.882
2	10	0.5	0.972	0.885	0.766	0.842	0.860	0.867	0.871	0.875	0.880	0.885	0.887
2	10	0.75	0.978	0.892	0.761	0.839	0.861	0.864	0.869	0.877	0.881	0.887	0.884
2	10	1	0.968	0.895	0.767	0.849	0.866	0.874	0.878	0.885	0.887	0.892	0.895
2	20	0	0.972	0.889	0.759	0.840	0.864	0.872	0.874	0.877	0.883	0.888	0.886
2	20	0.25	0.971	0.883	0.760	0.844	0.861	0.863	0.870	0.873	0.874	0.883	0.882
2	20	0.5	0.972	0.885	0.766	0.842	0.860	0.867	0.871	0.875	0.880	0.885	0.887
2	20	0.75	0.978	0.892	0.761	0.839	0.861	0.864	0.869	0.877	0.881	0.887	0.884
2	20	1	0.968	0.895	0.767	0.849	0.866	0.874	0.878	0.885	0.887	0.892	0.895
2	50	0	0.972	0.889	0.759	0.840	0.864	0.872	0.874	0.877	0.883	0.886	0.886
2	50	0.25	0.971	0.883	0.760	0.844	0.861	0.863	0.870	0.873	0.874	0.883	0.882
2	50	0.5	0.972	0.885	0.766	0.842	0.860	0.867	0.871	0.875	0.880	0.885	0.887
2	50	0.75	0.978	0.892	0.761	0.839	0.861	0.864	0.869	0.877	0.881	0.887	0.884
2	50	1	0.968	0.895	0.767	0.849	0.866	0.874	0.878	0.885	0.887	0.892	0.895
5	1	0	0.972	0.900	0.756	0.849	0.870	0.877	0.882	0.887	0.893	0.897	0.894
5	1	0.25	0.972	0.881	0.750	0.840	0.851	0.863	0.867	0.868	0.877	0.879	0.877
5	1	0.5	0.977	0.893	0.766	0.844	0.859	0.867	0.875	0.879	0.885	0.885	0.889
5	1	0.75	0.981	0.886	0.760	0.839	0.851	0.861	0.863	0.873	0.871	0.879	0.879
5	1	1	0.973	0.883	0.753	0.840	0.850	0.858	0.864	0.866	0.878	0.875	0.880

Table 5.5 (Cont.): Coverage Probabilities of mean for Crack distribution n = 50 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
5	5	0	0.972	0.900	0.756	0.849	0.870	0.877	0.882	0.887	0.893	0.897	0.894
5	5	0.25	0.972	0.881	0.750	0.840	0.851	0.863	0.867	0.868	0.877	0.879	0.877
5	5	0.5	0.977	0.893	0.766	0.844	0.859	0.867	0.875	0.879	0.885	0.885	0.889
5	5	0.75	0.981	0.886	0.760	0.839	0.851	0.861	0.863	0.873	0.874	0.879	0.879
5	5	1	0.973	0.883	0.753	0.840	0.850	0.858	0.864	0.866	0.878	0.875	0.880
5	10	0	0.972	0.900	0.756	0.849	0.870	0.877	0.882	0.887	0.893	0.897	0.894
5	10	0.25	0.972	0.881	0.750	0.840	0.851	0.863	0.867	0.868	0.877	0.879	0.877
5	10	0.5	0.977	0.893	0.766	0.844	0.859	0.867	0.875	0.879	0.885	0.885	0.889
5	10	0.75	0.981	0.886	0.760	0.839	0.851	0.861	0.863	0.873	0.874	0.879	0.879
5	10	1	0.973	0.883	0.753	0.840	0.850	0.858	0.864	0.866	0.878	0.875	0.880
5	20	0	0.972	0.900	0.756	0.849	0.870	0.877	0.882	0.887	0.893	0.897	0.894
5	20	0.25	0.972	0.881	0.750	0.840	0.851	0.863	0.867	0.868	0.877	0.879	0.877
5	20	0.5	0.977	0.893	0.766	0.844	0.859	0.867	0.875	0.879	0.885	0.885	0.889
5	20	0.75	0.981	0.886	0.760	0.839	0.851	0.861	0.863	0.873	0.874	0.879	0.879
5	20	1	0.973	0.883	0.753	0.840	0.850	0.858	0.864	0.866	0.878	0.875	0.880
5	50	0	0.972	0.900	0.756	0.849	0.870	0.877	0.882	0.887	0.893	0.897	0.894
5	50	0.25	0.972	0.881	0.750	0.840	0.851	0.863	0.867	0.868	0.877	0.879	0.877
5	50	0.5	0.977	0.893	0.766	0.844	0.859	0.867	0.875	0.879	0.885	0.885	0.889
5	50	0.75	0.981	0.886	0.760	0.839	0.851	0.861	0.863	0.873	0.874	0.879	0.879
5	50	1	0.973	0.883	0.753	0.840	0.850	0.858	0.864	0.866	0.878	0.875	0.880
10	1	0	0.980	0.896	0.762	0.848	0.866	0.872	0.882	0.884	0.889	0.893	0.896
10	1	0.25	0.985	0.891	0.757	0.833	0.858	0.861	0.874	0.880	0.884	0.892	0.893
10	1	0.5	0.980	0.898	0.740	0.844	0.868	0.870	0.880	0.878	0.895	0.889	0.895
10	1	0.75	0.982	0.900	0.752	0.843	0.865	0.867	0.877	0.884	0.886	0.890	0.892
10	1	1	0.981	0.895	0.755	0.833	0.857	0.865	0.874	0.879	0.890	0.893	0.888
10	5	0	0.980	0.896	0.762	0.848	0.866	0.872	0.882	0.884	0.889	0.893	0.896
10	5	0.25	0.985	0.891	0.757	0.833	0.858	0.861	0.874	0.880	0.884	0.892	0.893
10	5	0.5	0.980	0.898	0.740	0.844	0.868	0.870	0.880	0.878	0.895	0.889	0.895
10	5	0.75	0.982	0.900	0.752	0.843	0.865	0.867	0.877	0.884	0.886	0.890	0.892
10	5	1	0.981	0.895	0.755	0.833	0.857	0.865	0.874	0.879	0.890	0.893	0.888
10	10	0	0.980	0.896	0.762	0.848	0.866	0.872	0.882	0.884	0.889	0.893	0.896
10	10	0.25	0.985	0.891	0.757	0.833	0.858	0.861	0.874	0.880	0.884	0.892	0.893
10	10	0.5	0.980	0.898	0.740	0.844	0.868	0.870	0.880	0.878	0.895	0.889	0.895
10	10	0.75	0.982	0.900	0.752	0.843	0.865	0.867	0.877	0.884	0.886	0.890	0.892
10	10	1	0.981	0.895	0.755	0.833	0.857	0.865	0.874	0.879	0.890	0.893	0.888

Table 5.5 (Cont.): Coverage Probabilities of mean for Crack distribution n = 50 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
10	20	0	0.980	0.896	0.762	0.848	0.866	0.872	0.882	0.884	0.889	0.893	0.896
10	20	0.25	0.985	0.891	0.757	0.833	0.858	0.861	0.874	0.880	0.884	0.892	0.893
10	20	0.5	0.980	0.898	0.740	0.844	0.868	0.870	0.880	0.878	0.895	0.889	0.895
10	20	0.75	0.982	0.900	0.752	0.843	0.865	0.867	0.877	0.884	0.886	0.890	0.892
10	20	1	0.981	0.895	0.755	0.833	0.857	0.865	0.874	0.879	0.890	0.893	0.888
10	50	0	0.980	0.896	0.762	0.848	0.866	0.872	0.882	0.884	0.889	0.893	0.896
10	50	0.25	0.985	0.891	0.757	0.833	0.858	0.861	0.874	0.880	0.884	0.892	0.893
10	50	0.5	0.980	0.898	0.740	0.844	0.868	0.870	0.880	0.878	0.895	0.889	0.895
10	50	0.75	0.982	0.900	0.752	0.843	0.865	0.867	0.877	0.884	0.886	0.890	0.892
10	50	1	0.981	0.895	0.755	0.833	0.857	0.865	0.874	0.879	0.890	0.893	0.888
20	1	0	0.983	0.892	0.753	0.846	0.863	0.871	0.875	0.886	0.892	0.889	0.890
20	1	0.25	0.982	0.898	0.747	0.842	0.864	0.877	0.880	0.882	0.889	0.889	0.892
20	1	0.5	0.980	0.903	0.754	0.848	0.869	0.878	0.882	0.889	0.895	0.899	0.900
20	1	0.75	0.985	0.901	0.763	0.845	0.871	0.880	0.885	0.888	0.900	0.899	0.902
20	1	1	0.979	0.899	0.745	0.848	0.863	0.873	0.875	0.884	0.888	0.891	0.895
20	5	0	0.983	0.892	0.753	0.846	0.863	0.871	0.875	0.886	0.892	0.889	0.890
20	5	0.25	0.982	0.898	0.747	0.842	0.864	0.877	0.880	0.882	0.889	0.889	0.892
20	5	0.5	0.980	0.903	0.754	0.848	0.869	0.878	0.882	0.889	0.895	0.899	0.900
20	5	0.75	0.985	0.901	0.763	0.845	0.871	0.880	0.885	0.888	0.900	0.899	0.902
20	5	1	0.979	0.899	0.745	0.848	0.863	0.873	0.875	0.884	0.888	0.891	0.895
20	10	0	0.983	0.892	0.753	0.846	0.863	0.871	0.875	0.886	0.892	0.889	0.890
20	10	0.25	0.982	0.898	0.747	0.842	0.864	0.877	0.880	0.882	0.889	0.889	0.892
20	10	0.5	0.980	0.903	0.754	0.848	0.869	0.878	0.882	0.889	0.895	0.899	0.900
20	10	0.75	0.985	0.901	0.763	0.845	0.871	0.880	0.885	0.888	0.900	0.899	0.902
20	10	1	0.979	0.899	0.745	0.848	0.863	0.873	0.875	0.884	0.888	0.891	0.895
20	20	0	0.983	0.892	0.753	0.846	0.863	0.871	0.875	0.886	0.892	0.889	0.890
20	20	0.25	0.982	0.898	0.747	0.842	0.864	0.877	0.880	0.882	0.889	0.889	0.892
20	20	0.5	0.980	0.903	0.754	0.848	0.869	0.878	0.882	0.889	0.895	0.899	0.900
20	20	0.75	0.985	0.901	0.763	0.845	0.871	0.880	0.885	0.888	0.900	0.899	0.902
20	20	1	0.979	0.899	0.745	0.848	0.863	0.873	0.875	0.884	0.888	0.891	0.895

Table 5.5 (Cont.): Coverage Probabilities of mean for Crack distribution n = 50 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
20	50	0	0.983	0.892	0.753	0.846	0.863	0.871	0.875	0.886	0.892	0.889	0.890
20	50	0.25	0.982	0.898	0.747	0.842	0.864	0.877	0.880	0.882	0.889	0.889	0.892
20	50	0.5	0.980	0.903	0.754	0.848	0.869	0.878	0.882	0.889	0.895	0.899	0.900
20	50	0.75	0.985	0.901	0.763	0.845	0.871	0.880	0.885	0.888	0.900	0.899	0.902
20	50	1	0.979	0.899	0.745	0.848	0.863	0.873	0.875	0.884	0.888	0.891	0.895
50	1	0	0.979	0.902	0.760	0.851	0.874	0.881	0.886	0.888	0.895	0.900	0.902
50	1	0.25	0.978	0.901	0.755	0.850	0.866	0.872	0.880	0.888	0.891	0.890	0.897
50	1	0.5	0.978	0.902	0.758	0.857	0.875	0.880	0.883	0.893	0.899	0.899	0.901
50	1	0.75	0.977	0.907	0.760	0.849	0.866	0.874	0.880	0.887	0.896	0.900	0.900
50	1	1	0.979	0.906	0.762	0.847	0.868	0.873	0.878	0.884	0.892	0.899	0.898
50	5	0	0.979	0.902	0.760	0.851	0.874	0.881	0.886	0.888	0.895	0.900	0.902
50	5	0.25	0.978	0.901	0.755	0.850	0.866	0.872	0.880	0.888	0.891	0.890	0.897
50	5	0.5	0.978	0.902	0.758	0.857	0.875	0.880	0.883	0.893	0.899	0.899	0.901
50	5	0.75	0.977	0.907	0.760	0.849	0.866	0.874	0.880	0.887	0.896	0.900	0.900
50	5	1	0.979	0.906	0.762	0.847	0.868	0.873	0.878	0.884	0.892	0.899	0.898
50	10	0	0.979	0.902	0.760	0.851	0.874	0.881	0.886	0.888	0.895	0.900	0.902
50	10	0.25	0.978	0.901	0.755	0.850	0.866	0.872	0.880	0.888	0.891	0.890	0.897
50	10	0.5	0.978	0.902	0.758	0.857	0.875	0.880	0.883	0.893	0.899	0.899	0.901
50	10	0.75	0.977	0.907	0.760	0.849	0.866	0.874	0.880	0.887	0.896	0.900	0.900
50	10	1	0.979	0.906	0.762	0.847	0.868	0.873	0.878	0.884	0.892	0.899	0.898
50	20	0	0.979	0.902	0.760	0.851	0.874	0.881	0.886	0.888	0.895	0.900	0.902
50	20	0.25	0.978	0.901	0.755	0.850	0.866	0.872	0.880	0.888	0.891	0.890	0.897
50	20	0.5	0.978	0.902	0.758	0.857	0.875	0.880	0.883	0.893	0.899	0.899	0.901
50	20	0.75	0.977	0.907	0.760	0.849	0.866	0.874	0.880	0.887	0.896	0.900	0.900
50	20	1	0.979	0.906	0.762	0.847	0.868	0.873	0.878	0.884	0.892	0.899	0.898
50	50	0	0.979	0.902	0.760	0.851	0.874	0.881	0.886	0.888	0.895	0.900	0.902
50	50	0.25	0.978	0.901	0.755	0.850	0.866	0.872	0.880	0.888	0.891	0.890	0.897
50	50	0.5	0.978	0.902	0.758	0.857	0.875	0.880	0.883	0.893	0.899	0.899	0.901
50	50	0.75	0.977	0.907	0.760	0.849	0.866	0.874	0.880	0.887	0.896	0.900	0.900
50	50	1	0.979	0.906	0.762	0.847	0.868	0.873	0.878	0.884	0.892	0.899	0.898

Table 5.6: Coverage Probabilities of mean for Crack distribution n = 100 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
2	1	0	0.981	0.911	0.774	0.856	0.873	0.886	0.887	0.892	0.899	0.902	0.908
2	1	0.25	0.979	0.902	0.764	0.861	0.876	0.882	0.891	0.887	0.899	0.899	0.903
2	1	0.5	0.977	0.908	0.765	0.862	0.883	0.892	0.893	0.895	0.899	0.902	0.902
2	1	0.75	0.974	0.907	0.748	0.848	0.868	0.883	0.882	0.891	0.894	0.901	0.903
2	1	1	0.982	0.902	0.752	0.836	0.860	0.880	0.882	0.885	0.892	0.893	0.893
2	5	0	0.981	0.911	0.774	0.856	0.873	0.886	0.887	0.892	0.899	0.902	0.908
2	5	0.25	0.979	0.902	0.764	0.861	0.876	0.882	0.891	0.887	0.899	0.899	0.903
2	5	0.5	0.977	0.908	0.765	0.862	0.883	0.892	0.893	0.895	0.899	0.902	0.902
2	5	0.75	0.974	0.907	0.748	0.848	0.868	0.883	0.882	0.891	0.894	0.901	0.903
2	5	1	0.982	0.902	0.752	0.836	0.860	0.880	0.882	0.885	0.892	0.893	0.893
2	10	0	0.981	0.911	0.774	0.856	0.873	0.886	0.887	0.892	0.899	0.902	0.908
2	10	0.25	0.979	0.902	0.764	0.861	0.876	0.882	0.891	0.887	0.899	0.899	0.903
2	10	0.5	0.977	0.908	0.765	0.862	0.883	0.892	0.893	0.895	0.899	0.902	0.902
2	10	0.75	0.974	0.907	0.748	0.848	0.868	0.883	0.882	0.891	0.894	0.901	0.903
2	10	1	0.982	0.902	0.752	0.836	0.860	0.880	0.882	0.885	0.892	0.893	0.893
2	20	0	0.981	0.911	0.774	0.856	0.873	0.886	0.887	0.892	0.899	0.902	0.908
2	20	0.25	0.979	0.902	0.764	0.861	0.876	0.882	0.891	0.887	0.899	0.899	0.903
2	20	0.5	0.977	0.908	0.765	0.862	0.883	0.892	0.893	0.895	0.899	0.902	0.902
2	20	0.75	0.974	0.907	0.748	0.848	0.868	0.883	0.882	0.891	0.894	0.901	0.903
2	20	1	0.982	0.902	0.752	0.836	0.860	0.880	0.882	0.885	0.892	0.893	0.893
2	50	0	0.981	0.911	0.774	0.856	0.873	0.886	0.887	0.892	0.899	0.902	0.908
2	50	0.25	0.979	0.902	0.764	0.861	0.876	0.882	0.891	0.887	0.899	0.899	0.903
2	50	0.5	0.977	0.908	0.765	0.862	0.883	0.892	0.893	0.895	0.899	0.902	0.902
2	50	0.75	0.974	0.907	0.748	0.848	0.868	0.883	0.882	0.891	0.894	0.901	0.903
2	50	1	0.982	0.902	0.752	0.836	0.860	0.880	0.882	0.885	0.892	0.893	0.893
5	1	0	0.983	0.918	0.782	0.870	0.886	0.894	0.903	0.905	0.907	0.910	0.914
5	1	0.25	0.982	0.922	0.785	0.866	0.888	0.892	0.899	0.903	0.912	0.916	0.915
5	1	0.5	0.981	0.922	0.777	0.876	0.899	0.902	0.908	0.911	0.913	0.917	0.917
5	1	0.75	0.981	0.909	0.776	0.863	0.881	0.896	0.894	0.899	0.902	0.907	0.906
5	1	1	0.980	0.914	0.774	0.858	0.884	0.888	0.894	0.896	0.899	0.911	0.912

Table 5.6 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
5	5	0	0.983	0.918	0.782	0.870	0.886	0.894	0.903	0.905	0.907	0.910	0.914
5	5	0.25	0.982	0.922	0.785	0.866	0.888	0.892	0.899	0.903	0.912	0.916	0.915
5	5	0.5	0.981	0.922	0.777	0.876	0.899	0.902	0.908	0.911	0.913	0.917	0.917
5	5	0.75	0.981	0.909	0.776	0.863	0.881	0.896	0.894	0.899	0.902	0.907	0.906
5	5	1	0.980	0.914	0.774	0.858	0.884	0.888	0.894	0.896	0.899	0.911	0.912
5	10	0	0.983	0.918	0.782	0.870	0.886	0.894	0.903	0.905	0.907	0.910	0.914
5	10	0.25	0.982	0.922	0.785	0.866	0.888	0.892	0.899	0.903	0.912	0.916	0.915
5	10	0.5	0.981	0.922	0.777	0.876	0.899	0.902	0.908	0.911	0.913	0.917	0.917
5	10	0.75	0.981	0.909	0.776	0.863	0.881	0.896	0.894	0.899	0.902	0.907	0.906
5	10	1	0.980	0.914	0.774	0.858	0.884	0.888	0.894	0.896	0.899	0.911	0.912
5	20	0	0.983	0.918	0.782	0.870	0.886	0.894	0.903	0.905	0.907	0.910	0.914
5	20	0.25	0.982	0.922	0.785	0.866	0.888	0.892	0.899	0.903	0.912	0.916	0.915
5	20	0.5	0.981	0.922	0.777	0.876	0.899	0.902	0.908	0.911	0.913	0.917	0.917
5	20	0.75	0.981	0.909	0.776	0.863	0.881	0.896	0.894	0.899	0.902	0.907	0.906
5	20	1	0.980	0.914	0.774	0.858	0.884	0.888	0.894	0.896	0.899	0.911	0.912
5	50	0	0.983	0.918	0.782	0.870	0.886	0.894	0.903	0.905	0.907	0.910	0.914
5	50	0.25	0.982	0.922	0.785	0.866	0.888	0.892	0.899	0.903	0.912	0.916	0.915
5	50	0.5	0.981	0.922	0.777	0.876	0.899	0.902	0.908	0.911	0.913	0.917	0.917
5	50	0.75	0.981	0.909	0.776	0.863	0.881	0.896	0.894	0.899	0.902	0.907	0.906
5	50	1	0.980	0.914	0.774	0.858	0.884	0.888	0.894	0.896	0.899	0.911	0.912
10	1	0	0.986	0.902	0.788	0.879	0.888	0.900	0.898	0.906	0.914	0.918	0.913
10	1	0.25	0.981	0.903	0.784	0.867	0.880	0.890	0.894	0.895	0.903	0.903	0.906
10	1	0.5	0.984	0.915	0.782	0.864	0.882	0.895	0.902	0.904	0.908	0.910	0.910
10	1	0.75	0.982	0.904	0.768	0.867	0.882	0.894	0.896	0.896	0.903	0.905	0.907
10	1	1	0.982	0.914	0.754	0.863	0.882	0.894	0.892	0.899	0.908	0.911	0.911
10	5	0	0.986	0.920	0.788	0.879	0.888	0.900	0.898	0.906	0.914	0.918	0.913
10	5	0.25	0.981	0.903	0.784	0.867	0.880	0.890	0.894	0.895	0.903	0.903	0.906
10	5	0.5	0.984	0.915	0.782	0.864	0.882	0.895	0.902	0.904	0.908	0.910	0.910
10	5	0.75	0.982	0.904	0.768	0.867	0.882	0.894	0.896	0.896	0.903	0.905	0.907
10	5	1	0.982	0.914	0.754	0.863	0.882	0.894	0.892	0.899	0.908	0.911	0.911
10	10	0	0.986	0.920	0.788	0.879	0.888	0.900	0.898	0.906	0.914	0.918	0.913
10	10	0.25	0.981	0.903	0.784	0.867	0.880	0.890	0.894	0.895	0.903	0.903	0.906
10	10	0.5	0.984	0.915	0.782	0.864	0.882	0.895	0.902	0.904	0.908	0.910	0.910
10	10	0.75	0.982	0.904	0.768	0.867	0.882	0.894	0.896	0.896	0.903	0.905	0.907
10	10	1	0.982	0.914	0.754	0.863	0.882	0.894	0.892	0.899	0.908	0.911	0.911

Table 5.6 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
10	20	0	0.986	0.920	0.788	0.879	0.888	0.900	0.898	0.906	0.914	0.918	0.913
10	20	0.25	0.981	0.903	0.784	0.867	0.880	0.890	0.894	0.895	0.903	0.903	0.906
10	20	0.5	0.984	0.915	0.782	0.864	0.882	0.895	0.902	0.904	0.908	0.910	0.910
10	20	0.75	0.982	0.904	0.768	0.867	0.882	0.894	0.896	0.896	0.903	0.905	0.907
10	20	1	0.982	0.914	0.754	0.863	0.882	0.894	0.892	0.899	0.908	0.911	0.911
10	50	0	0.986	0.920	0.788	0.879	0.888	0.900	0.898	0.906	0.914	0.918	0.913
10	50	0.25	0.981	0.903	0.784	0.867	0.880	0.890	0.894	0.895	0.903	0.903	0.906
10	50	0.5	0.984	0.915	0.782	0.864	0.882	0.895	0.902	0.904	0.908	0.910	0.910
10	50	0.75	0.982	0.904	0.760	0.867	0.882	0.894	0.896	0.896	0.903	0.905	0.907
10	50	1	0.982	0.914	0.754	0.863	0.882	0.894	0.892	0.899	0.908	0.911	0.911
20	1	0	0.986	0.916	0.765	0.862	0.885	0.896	0.898	0.903	0.906	0.911	0.911
20	1	0.25	0.983	0.910	0.763	0.852	0.877	0.887	0.889	0.894	0.898	0.902	0.904
20	1	0.5	0.982	0.909	0.756	0.848	0.874	0.881	0.886	0.891	0.899	0.898	0.904
20	1	0.75	0.980	0.905	0.758	0.850	0.874	0.879	0.888	0.896	0.899	0.902	0.901
20	1	1	0.980	0.910	0.756	0.857	0.879	0.892	0.892	0.901	0.898	0.905	0.903
20	5	0	0.980	0.905	0.758	0.850	0.874	0.879	0.888	0.896	0.899	0.902	0.901
20	5	0.25	0.983	0.910	0.763	0.852	0.877	0.887	0.889	0.894	0.898	0.902	0.904
20	5	0.5	0.982	0.909	0.756	0.848	0.874	0.881	0.886	0.891	0.899	0.898	0.904
20	5	0.75	0.980	0.905	0.758	0.850	0.874	0.879	0.888	0.896	0.899	0.902	0.901
20	5	1	0.980	0.910	0.756	0.857	0.879	0.892	0.892	0.901	0.898	0.905	0.903
20	10	0	0.986	0.916	0.765	0.862	0.885	0.896	0.898	0.903	0.906	0.911	0.911
20	10	0.25	0.983	0.910	0.763	0.852	0.877	0.887	0.889	0.894	0.898	0.902	0.904
20	10	0.5	0.982	0.909	0.756	0.848	0.874	0.881	0.886	0.891	0.899	0.898	0.904
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20	10	1	0.980	0.910	0.756	0.857	0.879	0.892	0.892	0.901	0.898	0.905	0.903
20	20	0	0.986	0.916	0.765	0.862	0.885	0.896	0.898	0.903	0.906	0.911	0.911
20	20	0.25	0.983	0.910	0.763	0.852	0.877	0.887	0.889	0.894	0.898	0.902	0.904
20	20	0.5	0.982	0.909	0.756	0.848	0.874	0.881	0.886	0.891	0.899	0.898	0.904
20	20	0.75	0.980	0.905	0.758	0.850	0.874	0.879	0.888	0.896	0.899	0.902	0.901
20	20	1	0.980	0.910	0.756	0.857	0.879	0.892	0.892	0.901	0.898	0.905	0.903

Table 5.6 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
20	50	0	0.986	0.916	0.765	0.862	0.885	0.896	0.898	0.903	0.906	0.911	0.911
20	50	0.25	0.983	0.910	0.763	0.852	0.877	0.887	0.889	0.894	0.898	0.902	0.904
20	50	0.5	0.982	0.909	0.756	0.848	0.874	0.881	0.886	0.891	0.899	0.898	0.904
20	50	0.75	0.980	0.905	0.758	0.850	0.874	0.879	0.888	0.896	0.899	0.902	0.901
20	50	1	0.980	0.910	0.756	0.857	0.879	0.892	0.892	0.901	0.898	0.905	0.903
50	1	0	0.985	0.912	0.764	0.858	0.878	0.890	0.894	0.897	0.900	0.905	0.907
50	1	0.25	0.987	0.904	0.759	0.853	0.876	0.888	0.889	0.892	0.894	0.899	0.903
50	1	0.5	0.987	0.906	0.754	0.853	0.871	0.878	0.880	0.884	0.888	0.895	0.899
50	1	0.75	0.983	0.906	0.754	0.849	0.874	0.886	0.890	0.893	0.899	0.903	0.905
50	1	1	0.982	0.903	0.753	0.849	0.876	0.882	0.886	0.891	0.896	0.895	0.905
50	5	0	0.985	0.912	0.764	0.858	0.878	0.890	0.894	0.897	0.900	0.905	0.907
50	5	0.25	0.987	0.904	0.759	0.853	0.876	0.888	0.889	0.892	0.894	0.899	0.903
50	5	0.5	0.987	0.906	0.754	0.853	0.871	0.878	0.880	0.884	0.888	0.895	0.899
50	5	0.75	0.983	0.906	0.754	0.849	0.874	0.886	0.890	0.893	0.899	0.903	0.905
50	5	1	0.982	0.903	0.753	0.849	0.876	0.882	0.886	0.891	0.896	0.895	0.905
50	10	0	0.985	0.912	0.764	0.858	0.878	0.890	0.894	0.897	0.900	0.905	0.907
50	10	0.25	0.987	0.904	0.759	0.853	0.876	0.888	0.889	0.892	0.894	0.899	0.903
50	10	0.5	0.987	0.906	0.754	0.853	0.871	0.878	0.880	0.884	0.888	0.895	0.899
50	10	0.75	0.983	0.906	0.754	0.849	0.874	0.886	0.890	0.893	0.899	0.903	0.905
50	10	1	0.982	0.903	0.753	0.849	0.876	0.882	0.886	0.891	0.896	0.895	0.905
50	20	0	0.985	0.912	0.764	0.858	0.878	0.890	0.894	0.897	0.900	0.905	0.907
50	20	0.25	0.987	0.904	0.759	0.853	0.876	0.888	0.889	0.892	0.894	0.899	0.903
50	20	0.5	0.987	0.906	0.754	0.853	0.871	0.878	0.880	0.884	0.888	0.895	0.899
50	20	0.75	0.983	0.906	0.754	0.849	0.877	0.886	0.890	0.893	0.899	0.903	0.905
50	20	1	0.982	0.903	0.753	0.849	0.876	0.882	0.886	0.891	0.896	0.895	0.905
50	50	0	0.985	0.912	0.764	0.858	0.878	0.890	0.894	0.897	0.900	0.905	0.907
50	50	0.25	0.987	0.904	0.759	0.853	0.876	0.888	0.889	0.892	0.894	0.899	0.903
50	50	0.5	0.987	0.906	0.754	0.853	0.871	0.878	0.880	0.884	0.888	0.895	0.899
50	50	0.75	0.983	0.906	0.754	0.849	0.874	0.886	0.890	0.893	0.899	0.903	0.905
50	50	1	0.982	0.903	0.753	0.849	0.876	0.882	0.886	0.891	0.896	0.895	0.905

Table 5.7: Coverage Probabilities of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	2	1	0	0.951	0.863	0.835	0.857	0.855	0.859	0.864	0.862	0.861	0.863	0.867
	2	1	0.25	0.952	0.864	0.837	0.853	0.861	0.861	0.863	0.862	0.864	0.866	0.868
	2	1	0.5	0.948	0.868	0.826	0.858	0.861	0.864	0.868	0.866	0.869	0.866	0.875
	2	1	0.75	0.940	0.853	0.818	0.840	0.840	0.847	0.849	0.848	0.851	0.850	0.851
	2	1	1	0.929	0.840	0.815	0.834	0.834	0.840	0.841	0.839	0.840	0.841	0.846
	2	5	0	0.951	0.863	0.835	0.857	0.855	0.859	0.864	0.862	0.861	0.863	0.867
	2	5	0.25	0.952	0.864	0.837	0.853	0.861	0.861	0.863	0.862	0.864	0.866	0.868
	2	5	0.5	0.948	0.868	0.826	0.858	0.861	0.864	0.868	0.866	0.869	0.866	0.875
	2	5	0.75	0.940	0.853	0.818	0.840	0.840	0.847	0.849	0.848	0.851	0.850	0.851
	2	5	1	0.929	0.840	0.815	0.834	0.834	0.840	0.841	0.839	0.840	0.841	0.846
	2	10	0	0.951	0.863	0.835	0.857	0.855	0.859	0.864	0.862	0.861	0.863	0.867
	2	10	0.25	0.952	0.864	0.837	0.853	0.861	0.861	0.863	0.862	0.864	0.866	0.868
	2	10	0.5	0.948	0.868	0.826	0.858	0.861	0.864	0.868	0.866	0.869	0.866	0.875
	2	10	0.75	0.940	0.853	0.818	0.840	0.840	0.847	0.849	0.848	0.851	0.850	0.851
	2	10	1	0.929	0.840	0.815	0.834	0.834	0.840	0.841	0.839	0.840	0.841	0.846
	2	20	0	0.951	0.863	0.835	0.857	0.855	0.859	0.864	0.862	0.861	0.863	0.867
	2	20	0.25	0.952	0.864	0.837	0.853	0.861	0.861	0.863	0.862	0.864	0.866	0.868
	2	20	0.5	0.948	0.868	0.826	0.858	0.861	0.864	0.868	0.866	0.869	0.866	0.875
	2	20	0.75	0.940	0.853	0.818	0.840	0.840	0.847	0.849	0.848	0.851	0.850	0.851
	2	20	1	0.929	0.840	0.815	0.834	0.834	0.840	0.841	0.839	0.840	0.841	0.846
	2	50	0	0.951	0.863	0.835	0.857	0.855	0.859	0.864	0.862	0.861	0.863	0.867
	2	50	0.25	0.952	0.864	0.837	0.853	0.861	0.861	0.863	0.862	0.864	0.866	0.868
	2	50	0.5	0.948	0.868	0.826	0.858	0.861	0.864	0.868	0.866	0.869	0.866	0.875
	2	50	0.75	0.940	0.853	0.818	0.840	0.840	0.847	0.849	0.848	0.851	0.850	0.851
	2	50	1	0.929	0.840	0.815	0.834	0.834	0.840	0.841	0.839	0.840	0.841	0.846
	5	1	0	0.963	0.874	0.847	0.860	0.868	0.867	0.871	0.873	0.872	0.872	0.872
	5	1	0.25	0.966	0.879	0.846	0.863	0.871	0.866	0.867	0.866	0.877	0.875	0.872
	5	1	0.5	0.969	0.884	0.842	0.862	0.876	0.879	0.877	0.881	0.880	0.882	0.882
	5	1	0.75	0.962	0.883	0.847	0.870	0.878	0.874	0.880	0.878	0.878	0.882	0.885
	5	1	1	0.959	0.867	0.830	0.853	0.860	0.866	0.861	0.864	0.865	0.869	0.877

Table 5.7 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	5	5	0	0.963	0.874	0.847	0.860	0.868	0.867	0.871	0.873	0.872	0.872	0.872
	5	5	0.25	0.966	0.879	0.846	0.863	0.871	0.866	0.867	0.866	0.877	0.875	0.872
	5	5	0.5	0.969	0.884	0.842	0.862	0.876	0.879	0.877	0.881	0.880	0.882	0.882
	5	5	0.75	0.962	0.883	0.847	0.870	0.878	0.874	0.880	0.878	0.878	0.882	0.885
	5	5	1	0.959	0.867	0.830	0.853	0.860	0.866	0.861	0.864	0.865	0.869	0.877
	5	10	0	0.963	0.874	0.847	0.860	0.868	0.867	0.871	0.873	0.872	0.872	0.872
	5	10	0.25	0.966	0.879	0.846	0.863	0.871	0.866	0.867	0.866	0.877	0.875	0.872
	5	10	0.5	0.969	0.884	0.842	0.862	0.876	0.879	0.877	0.881	0.880	0.882	0.882
	5	10	0.75	0.962	0.883	0.847	0.870	0.878	0.874	0.880	0.878	0.878	0.882	0.885
	5	10	1	0.959	0.867	0.830	0.853	0.860	0.866	0.861	0.864	0.865	0.869	0.877
	5	20	0	0.963	0.874	0.847	0.860	0.868	0.867	0.871	0.873	0.872	0.872	0.872
	5	20	0.25	0.966	0.879	0.846	0.863	0.871	0.866	0.867	0.866	0.877	0.875	0.872
	5	20	0.5	0.969	0.884	0.842	0.862	0.876	0.879	0.877	0.881	0.880	0.882	0.882
	5	20	0.75	0.962	0.883	0.847	0.870	0.878	0.874	0.880	0.878	0.878	0.882	0.885
	5	20	1	0.959	0.867	0.830	0.853	0.860	0.866	0.861	0.864	0.865	0.869	0.877
	5	50	0	0.963	0.874	0.847	0.860	0.868	0.867	0.871	0.873	0.872	0.872	0.872
	5	50	0.25	0.966	0.879	0.846	0.863	0.871	0.866	0.867	0.866	0.877	0.872	0.872
0.75	5	50	0.5	0.969	0.884	0.842	0.862	0.876	0.879	0.877	0.881	0.880	0.882	0.882
	5	50	0.75	0.962	0.883	0.847	0.870	0.878	0.874	0.880	0.878	0.878	0.882	0.885
	5	50	1	0.959	0.867	0.830	0.853	0.860	0.866	0.861	0.864	0.865	0.869	0.877
	10	1	0	0.972	0.885	0.850	0.871	0.882	0.881	0.885	0.881	0.889	0.884	0.888
	10	1	0.25	0.968	0.881	0.850	0.868	0.875	0.877	0.880	0.878	0.886	0.883	0.884
	10	1	0.5	0.966	0.876	0.835	0.861	0.869	0.870	0.874	0.873	0.878	0.873	0.877
	10	1	0.75	0.969	0.876	0.838	0.859	0.863	0.864	0.874	0.868	0.880	0.873	0.872
	10	1	1	0.967	0.880	0.832	0.863	0.870	0.866	0.869	0.870	0.874	0.874	0.878
	10	5	0	0.972	0.885	0.850	0.871	0.882	0.881	0.885	0.881	0.889	0.884	0.888
	10	5	0.25	0.968	0.881	0.850	0.868	0.875	0.877	0.880	0.878	0.886	0.883	0.884
	10	5	0.5	0.966	0.876	0.835	0.861	0.869	0.870	0.874	0.873	0.878	0.873	0.877
	10	5	0.75	0.969	0.876	0.838	0.859	0.863	0.864	0.874	0.868	0.880	0.873	0.872
	10	5	1	0.967	0.880	0.832	0.863	0.870	0.866	0.869	0.870	0.874	0.874	0.878
	10	10	0	0.972	0.885	0.850	0.871	0.882	0.881	0.885	0.881	0.889	0.884	0.888
	10	10	0.25	0.968	0.881	0.850	0.868	0.875	0.877	0.880	0.878	0.886	0.883	0.884
	10	10	0.5	0.966	0.876	0.835	0.861	0.869	0.870	0.874	0.873	0.878	0.873	0.877
	10	10	0.75	0.969	0.876	0.838	0.859	0.863	0.864	0.874	0.868	0.880	0.873	0.872
	10	10	1	0.967	0.880	0.832	0.863	0.870	0.866	0.869	0.870	0.874	0.874	0.878

Table 5.7 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	10	20	0	0.972	0.885	0.850	0.871	0.882	0.881	0.885	0.881	0.889	0.884	0.888
	10	20	0.25	0.986	0.881	0.850	0.868	0.875	0.877	0.880	0.878	0.886	0.883	0.884
	10	20	0.5	0.966	0.876	0.835	0.861	0.869	0.870	0.874	0.873	0.878	0.873	0.877
	10	20	0.75	0.969	0.876	0.838	0.859	0.863	0.864	0.874	0.868	0.880	0.873	0.872
	10	20	1	0.967	0.880	0.832	0.863	0.870	0.866	0.869	0.870	0.874	0.874	0.878
	10	50	0	0.972	0.885	0.850	0.871	0.882	0.881	0.885	0.881	0.889	0.884	0.888
	10	50	0.25	0.968	0.881	0.850	0.868	0.875	0.877	0.880	0.878	0.886	0.883	0.884
	10	50	0.5	0.966	0.876	0.835	0.861	0.869	0.870	0.874	0.873	0.878	0.873	0.877
	10	50	0.75	0.969	0.876	0.838	0.859	0.863	0.864	0.874	0.868	0.880	0.873	0.872
	10	50	1	0.967	0.880	0.832	0.863	0.870	0.866	0.869	0.870	0.874	0.874	0.878
	20	1	0	0.976	0.884	0.850	0.865	0.875	0.877	0.877	0.878	0.883	0.880	0.881
	20	1	0.25	0.973	0.881	0.846	0.869	0.874	0.878	0.878	0.884	0.886	0.885	0.883
	20	1	0.5	0.973	0.874	0.844	0.860	0.869	0.874	0.875	0.873	0.878	0.877	0.875
	20	1	0.75	0.972	0.872	0.832	0.854	0.867	0.862	0.872	0.874	0.872	0.873	0.873
	20	1	1	0.975	0.876	0.836	0.863	0.874	0.872	0.873	0.874	0.876	0.880	0.881
	20	5	0	0.976	0.884	0.850	0.865	0.875	0.877	0.877	0.878	0.883	0.880	0.881
	20	5	0.25	0.973	0.881	0.846	0.869	0.874	0.878	0.878	0.884	0.886	0.885	0.883
	20	5	0.5	0.973	0.874	0.844	0.860	0.869	0.874	0.875	0.873	0.878	0.877	0.875
	20	5	0.75	0.972	0.872	0.832	0.854	0.867	0.862	0.872	0.874	0.872	0.873	0.873
	20	5	1	0.975	0.876	0.836	0.863	0.874	0.872	0.873	0.874	0.876	0.880	0.881
	20	10	0	0.976	0.884	0.850	0.865	0.875	0.877	0.877	0.878	0.883	0.880	0.881
	20	10	0.25	0.973	0.881	0.846	0.869	0.874	0.878	0.878	0.884	0.886	0.885	0.883
	20	10	0.5	0.973	0.874	0.844	0.860	0.869	0.874	0.875	0.873	0.878	0.877	0.875
	20	10	0.75	0.972	0.872	0.832	0.854	0.867	0.862	0.872	0.874	0.872	0.873	0.873
	20	10	1	0.975	0.876	0.836	0.863	0.874	0.872	0.873	0.874	0.876	0.880	0.881
	20	20	0	0.976	0.884	0.850	0.865	0.875	0.877	0.877	0.878	0.883	0.880	0.881
	20	20	0.25	0.973	0.881	0.846	0.869	0.874	0.878	0.878	0.884	0.886	0.885	0.883
	20	20	0.5	0.973	0.874	0.844	0.860	0.869	0.874	0.875	0.873	0.878	0.877	0.875
	20	20	0.75	0.972	0.872	0.832	0.854	0.867	0.862	0.872	0.874	0.872	0.873	0.873
	20	20	1	0.975	0.876	0.836	0.863	0.874	0.872	0.873	0.874	0.876	0.880	0.881

Table 5.7 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	20	50	0	0.976	0.884	0.850	0.865	0.875	0.877	0.877	0.878	0.883	0.880	0.881
	20	50	0.25	0.973	0.881	0.846	0.869	0.874	0.878	0.878	0.884	0.886	0.885	0.883
	20	50	0.5	0.973	0.874	0.844	0.860	0.869	0.874	0.875	0.873	0.878	0.877	0.875
	20	50	0.75	0.972	0.872	0.832	0.854	0.867	0.862	0.872	0.874	0.872	0.873	0.873
	20	50	1	0.975	0.876	0.836	0.863	0.874	0.872	0.873	0.874	0.876	0.880	0.881
	50	1	0	0.977	0.875	0.844	0.863	0.870	0.868	0.872	0.871	0.873	0.871	0.876
	50	1	0.25	0.973	0.876	0.848	0.862	0.867	0.870	0.871	0.871	0.873	0.875	0.881
	50	1	0.5	0.975	0.880	0.845	0.861	0.870	0.866	0.868	0.874	0.876	0.877	0.879
	50	1	0.75	0.972	0.872	0.835	0.854	0.864	0.865	0.866	0.868	0.869	0.869	0.872
	50	1	1	0.976	0.875	0.843	0.857	0.865	0.870	0.871	0.871	0.877	0.876	0.877
	50	5	0	0.977	0.875	0.844	0.863	0.870	0.868	0.872	0.871	0.873	0.871	0.876
	50	5	0.25	0.973	0.876	0.848	0.862	0.867	0.870	0.871	0.871	0.873	0.875	0.881
	50	5	0.5	0.975	0.880	0.845	0.861	0.870	0.866	0.868	0.874	0.876	0.877	0.879
	50	5	0.75	0.972	0.872	0.835	0.854	0.864	0.865	0.866	0.868	0.869	0.869	0.872
	50	5	1	0.976	0.875	0.843	0.857	0.865	0.870	0.871	0.871	0.877	0.876	0.877
	50	10	0	0.977	0.875	0.844	0.863	0.870	0.868	0.872	0.871	0.873	0.871	0.876
	50	10	0.25	0.973	0.876	0.848	0.862	0.867	0.870	0.871	0.871	0.873	0.875	0.881
	50	10	0.5	0.975	0.880	0.845	0.861	0.870	0.866	0.868	0.874	0.876	0.877	0.879
	50	10	0.75	0.972	0.872	0.835	0.854	0.864	0.865	0.866	0.868	0.869	0.869	0.872
	50	10	1	0.976	0.875	0.843	0.857	0.865	0.870	0.871	0.871	0.877	0.876	0.877
	50	20	0	0.977	0.875	0.844	0.863	0.870	0.868	0.872	0.871	0.873	0.871	0.876
	50	20	0.25	0.973	0.876	0.848	0.862	0.867	0.870	0.871	0.871	0.873	0.875	0.881
	50	20	0.5	0.975	0.880	0.845	0.861	0.870	0.866	0.868	0.874	0.876	0.877	0.879
	50	20	0.75	0.972	0.872	0.835	0.854	0.864	0.865	0.866	0.868	0.869	0.869	0.872
	50	20	1	0.976	0.875	0.843	0.857	0.865	0.870	0.871	0.871	0.877	0.876	0.877
	50	50	0	0.977	0.875	0.844	0.863	0.870	0.868	0.872	0.871	0.873	0.871	0.876
	50	50	0.25	0.973	0.876	0.848	0.862	0.867	0.870	0.871	0.871	0.873	0.875	0.881
	50	50	0.5	0.975	0.880	0.845	0.861	0.870	0.866	0.868	0.874	0.876	0.877	0.879
	50	50	0.75	0.972	0.872	0.835	0.854	0.864	0.865	0.866	0.868	0.869	0.869	0.872
	50	50	1	0.976	0.875	0.843	0.857	0.865	0.870	0.871	0.871	0.877	0.876	0.877

Table 5.7 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	2	1	0	0.951	0.863	0.843	0.861	0.859	0.860	0.864	0.862	0.862	0.863	0.868
	2	1	0.25	0.952	0.864	0.845	0.855	0.866	0.862	0.864	0.862	0.867	0.866	0.870
	2	1	0.5	0.948	0.868	0.842	0.863	0.863	0.866	0.871	0.866	0.870	0.868	0.876
	2	1	0.75	0.940	0.853	0.824	0.846	0.843	0.847	0.849	0.851	0.851	0.851	0.851
	2	1	1	0.929	0.840	0.825	0.836	0.836	0.840	0.842	0.410	0.843	0.842	0.847
	2	5	0	0.951	0.863	0.843	0.861	0.859	0.860	0.864	0.862	0.862	0.863	0.868
	2	5	0.25	0.952	0.864	0.845	0.855	0.866	0.862	0.864	0.862	0.867	0.866	0.870
	2	5	0.5	0.948	0.868	0.842	0.863	0.863	0.866	0.871	0.866	0.870	0.868	0.876
	2	5	0.75	0.940	0.853	0.824	0.846	0.843	0.847	0.849	0.851	0.851	0.851	0.851
	2	5	1	0.929	0.840	0.825	0.836	0.836	0.840	0.842	0.841	0.843	0.842	0.847
	2	10	0	0.951	0.863	0.843	0.861	0.859	0.860	0.864	0.862	0.862	0.863	0.868
	2	10	0.25	0.952	0.864	0.845	0.855	0.866	0.862	0.864	0.862	0.867	0.866	0.870
0.85	2	10	0.5	0.948	0.868	0.842	0.863	0.863	0.866	0.871	0.866	0.870	0.868	0.876
	2	10	0.75	0.940	0.853	0.824	0.846	0.843	0.847	0.849	0.851	0.851	0.851	0.851
	2	10	1	0.929	0.840	0.825	0.836	0.836	0.840	0.842	0.841	0.843	0.842	0.847
	2	20	0	0.951	0.863	0.843	0.861	0.859	0.860	0.864	0.862	0.862	0.863	0.868
	2	20	0.25	0.952	0.864	0.845	0.855	0.866	0.862	0.864	0.862	0.867	0.866	0.870
	2	20	0.5	0.948	0.868	0.842	0.863	0.863	0.866	0.871	0.866	0.870	0.868	0.876
	2	20	0.75	0.940	0.853	0.824	0.846	0.843	0.847	0.849	0.851	0.851	0.851	0.851
	2	20	1	0.929	0.840	0.825	0.836	0.836	0.840	0.842	0.841	0.843	0.842	0.847
	2	50	0	0.951	0.863	0.843	0.861	0.859	0.860	0.864	0.862	0.862	0.863	0.868
	2	50	0.25	0.952	0.864	0.845	0.855	0.866	0.862	0.864	0.862	0.867	0.866	0.870
	2	50	0.5	0.948	0.868	0.842	0.863	0.863	0.866	0.871	0.866	0.870	0.868	0.876
	2	50	0.75	0.940	0.853	0.824	0.846	0.843	0.847	0.849	0.851	0.851	0.851	0.851
	2	50	1	0.929	0.840	0.825	0.836	0.836	0.840	0.842	0.841	0.843	0.842	0.847

Table 5.7 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.85	5	1	0	0.963	0.874	0.857	0.862	0.869	0.870	0.873	0.873	0.872	0.875	0.872
	5	1	0.25	0.966	0.879	0.861	0.864	0.873	0.869	0.871	0.866	0.880	0.876	0.874
	5	1	0.5	0.969	0.884	0.856	0.868	0.879	0.880	0.879	0.881	0.880	0.883	0.882
	5	1	0.75	0.962	0.883	0.861	0.876	0.880	0.876	0.882	0.878	0.880	0.882	0.885
	5	1	1	0.959	0.867	0.841	0.862	0.862	0.868	0.863	0.865	0.865	0.874	0.878
	5	5	0	0.963	0.874	0.857	0.862	0.869	0.870	0.873	0.873	0.872	0.875	0.872
	5	5	0.25	0.966	0.879	0.861	0.864	0.873	0.869	0.871	0.866	0.880	0.876	0.874
	5	5	0.5	0.969	0.884	0.856	0.868	0.879	0.880	0.879	0.881	0.880	0.883	0.882
	5	5	0.75	0.962	0.883	0.861	0.876	0.880	0.876	0.882	0.878	0.880	0.882	0.885
	5	5	1	0.959	0.867	0.841	0.862	0.862	0.868	0.863	0.865	0.865	0.874	0.878
	5	10	0	0.963	0.874	0.857	0.862	0.869	0.870	0.873	0.873	0.872	0.875	0.872
	5	10	0.25	0.966	0.879	0.861	0.864	0.873	0.869	0.871	0.866	0.880	0.876	0.874
	5	10	0.5	0.969	0.884	0.856	0.868	0.879	0.880	0.879	0.881	0.880	0.883	0.882
	5	10	0.75	0.962	0.883	0.861	0.876	0.880	0.876	0.882	0.878	0.880	0.882	0.885
	5	10	1	0.959	0.867	0.841	0.862	0.862	0.868	0.863	0.865	0.865	0.874	0.878
	5	20	0	0.963	0.874	0.857	0.862	0.869	0.870	0.873	0.873	0.872	0.875	0.872
	5	20	0.25	0.966	0.879	0.861	0.864	0.873	0.869	0.871	0.866	0.880	0.876	0.874
	5	20	0.5	0.969	0.884	0.856	0.868	0.879	0.880	0.879	0.881	0.880	0.883	0.882
	5	20	0.75	0.962	0.883	0.861	0.876	0.880	0.876	0.882	0.878	0.880	0.882	0.885
	5	20	1	0.959	0.867	0.841	0.862	0.862	0.868	0.863	0.865	0.865	0.874	0.878
	5	50	0	0.963	0.874	0.857	0.862	0.869	0.870	0.873	0.873	0.872	0.875	0.872
	5	50	0.25	0.966	0.879	0.861	0.864	0.873	0.869	0.871	0.866	0.880	0.876	0.874
	5	50	0.5	0.969	0.884	0.856	0.868	0.879	0.880	0.879	0.881	0.880	0.883	0.882
	5	50	0.75	0.962	0.883	0.861	0.876	0.880	0.876	0.882	0.878	0.880	0.882	0.885
	5	50	1	0.959	0.867	0.841	0.862	0.862	0.868	0.863	0.865	0.865	0.874	0.878
	10	1	0	0.972	0.885	0.862	0.878	0.883	0.885	0.887	0.883	0.889	0.886	0.888
	10	1	0.25	0.968	0.881	0.859	0.874	0.880	0.880	0.882	0.881	0.888	0.883	0.885
	10	1	0.5	0.966	0.876	0.852	0.866	0.870	0.872	0.875	0.874	0.879	0.874	0.877
	10	1	0.75	0.969	0.876	0.852	0.865	0.865	0.865	0.876	0.868	0.881	0.875	0.874
	10	1	1	0.967	0.880	0.849	0.866	0.873	0.869	0.873	0.872	0.878	0.875	0.878
	10	5	0	0.972	0.885	0.862	0.878	0.883	0.885	0.887	0.883	0.889	0.886	0.888
	10	5	0.25	0.968	0.881	0.859	0.874	0.880	0.880	0.882	0.881	0.888	0.883	0.885
	10	5	0.5	0.966	0.876	0.852	0.866	0.870	0.872	0.875	0.874	0.879	0.874	0.877
	10	5	0.75	0.969	0.876	0.852	0.865	0.865	0.865	0.876	0.868	0.881	0.875	0.874
	10	5	1	0.967	0.880	0.849	0.866	0.873	0.869	0.873	0.872	0.878	0.875	0.878

Table 5.7 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.85	10	10	0	0.972	0.885	0.862	0.878	0.883	0.885	0.887	0.883	0.889	0.886	0.888
	10	10	0.25	0.968	0.881	0.859	0.874	0.880	0.880	0.882	0.881	0.888	0.883	0.885
	10	10	0.5	0.966	0.876	0.852	0.866	0.870	0.872	0.875	0.874	0.879	0.874	0.877
	10	10	0.75	0.969	0.876	0.852	0.865	0.865	0.865	0.876	0.868	0.881	0.875	0.874
	10	10	1	0.967	0.880	0.849	0.866	0.873	0.869	0.873	0.872	0.878	0.875	0.878
	10	20	0	0.972	0.885	0.862	0.878	0.883	0.885	0.887	0.883	0.889	0.886	0.888
	10	20	0.25	0.968	0.881	0.859	0.874	0.880	0.880	0.882	0.881	0.888	0.883	0.885
	10	20	0.5	0.966	0.876	0.852	0.866	0.870	0.872	0.875	0.874	0.879	0.874	0.877
	10	20	0.75	0.969	0.876	0.852	0.865	0.865	0.865	0.876	0.868	0.881	0.875	0.874
	10	20	1	0.967	0.880	0.849	0.866	0.873	0.869	0.873	0.872	0.878	0.875	0.878
	10	50	0	0.972	0.885	0.862	0.878	0.883	0.885	0.887	0.883	0.889	0.886	0.888
	10	50	0.25	0.968	0.881	0.859	0.874	0.880	0.880	0.882	0.881	0.888	0.883	0.885
	10	50	0.5	0.966	0.876	0.852	0.866	0.870	0.872	0.875	0.874	0.879	0.874	0.877
	10	50	0.75	0.969	0.876	0.852	0.865	0.865	0.865	0.876	0.868	0.881	0.875	0.874
	10	50	1	0.967	0.880	0.849	0.866	0.873	0.869	0.873	0.872	0.878	0.875	0.878
	20	1	0	0.976	0.884	0.864	0.874	0.878	0.880	0.877	0.879	0.884	0.880	0.886
	20	1	0.25	0.973	0.881	0.861	0.875	0.879	0.879	0.878	0.885	0.886	0.885	0.886
	20	1	0.5	0.973	0.874	0.857	0.864	0.873	0.876	0.875	0.874	0.879	0.878	0.878
	20	1	0.75	0.972	0.872	0.846	0.864	0.872	0.862	0.873	0.875	0.874	0.875	0.874
	20	1	1	0.975	0.876	0.846	0.868	0.876	0.876	0.874	0.877	0.878	0.882	0.882
	20	5	0	0.976	0.884	0.864	0.874	0.878	0.880	0.877	0.879	0.884	0.880	0.886
	20	5	0.25	0.973	0.881	0.861	0.875	0.879	0.879	0.878	0.885	0.886	0.885	0.886
	20	5	0.5	0.973	0.874	0.857	0.864	0.873	0.876	0.875	0.874	0.879	0.878	0.878
	20	5	0.75	0.972	0.872	0.846	0.864	0.872	0.862	0.873	0.875	0.874	0.875	0.874
	20	5	1	0.975	0.876	0.846	0.868	0.876	0.876	0.874	0.877	0.878	0.882	0.882
	20	10	0	0.976	0.884	0.864	0.874	0.878	0.880	0.877	0.879	0.884	0.880	0.886
	20	10	0.25	0.973	0.881	0.861	0.875	0.879	0.879	0.878	0.885	0.886	0.885	0.886
	20	10	0.5	0.973	0.874	0.857	0.864	0.873	0.876	0.875	0.874	0.879	0.878	0.878
	20	10	0.75	0.972	0.872	0.846	0.864	0.872	0.862	0.873	0.875	0.874	0.875	0.874
	20	10	1	0.975	0.876	0.846	0.868	0.876	0.876	0.874	0.877	0.878	0.882	0.882
	20	20	0	0.976	0.884	0.864	0.874	0.878	0.880	0.877	0.879	0.884	0.880	0.886
	20	20	0.25	0.973	0.881	0.861	0.875	0.879	0.879	0.878	0.885	0.886	0.885	0.886
	20	20	0.5	0.973	0.874	0.857	0.864	0.873	0.876	0.875	0.874	0.879	0.878	0.878
	20	20	0.75	0.972	872.000	0.846	0.864	0.872	0.862	0.873	0.875	0.874	0.875	0.874
	20	20	1	0.975	0.876	0.846	0.868	0.876	0.876	0.874	0.877	0.878	0.882	0.882

Table 5.7 (Cont.): Coverage Probabilities of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.85	20	50	0	0.976	0.884	0.864	0.874	0.878	0.880	0.877	0.879	0.884	0.880	0.886
	20	50	0.25	0.973	0.881	0.861	0.875	0.879	0.879	0.878	0.885	0.886	0.885	0.886
	20	50	0.5	0.973	0.874	0.857	0.864	0.873	0.876	0.875	0.874	0.879	0.878	0.878
	20	50	0.75	0.972	0.872	0.846	0.864	0.872	0.862	0.873	0.875	0.874	0.875	0.874
	20	50	1	0.975	0.876	0.846	0.868	0.876	0.876	0.874	0.877	0.878	0.882	0.882
	50	1	0	0.977	0.875	0.858	0.865	0.872	0.875	0.873	0.871	0.873	0.871	0.876
	50	1	0.25	0.973	0.876	0.856	0.864	0.872	0.873	0.872	0.872	0.876	0.876	0.881
	50	1	0.5	0.975	0.880	0.855	0.866	0.873	0.867	0.871	0.877	0.877	0.878	0.881
	50	1	0.75	0.972	0.872	0.847	0.864	0.864	0.865	0.867	0.868	0.869	0.870	0.874
	50	1	1	0.976	0.875	0.851	0.863	0.866	0.871	0.873	0.873	0.878	0.879	0.877
	50	5	0	0.977	0.875	0.858	0.865	0.872	0.875	0.873	0.871	0.873	0.871	0.876
	50	5	0.25	0.973	0.876	0.856	0.864	0.872	0.873	0.872	0.872	0.876	0.876	0.881
	50	5	0.5	0.975	0.880	0.855	0.866	0.873	0.867	0.871	0.877	0.877	0.878	0.881
	50	5	0.75	0.972	0.872	0.847	0.864	0.864	0.865	0.867	0.868	0.869	0.870	0.874
	50	5	1	0.976	0.875	0.851	0.863	0.866	0.871	0.873	0.873	0.878	0.879	0.877
	50	10	0	0.977	0.875	0.858	0.865	0.872	0.875	0.873	0.871	0.873	0.871	0.876
	50	10	0.25	0.973	0.876	0.856	0.864	0.872	0.873	0.872	0.872	0.876	0.876	0.881
	50	10	0.5	0.975	0.880	0.855	0.866	0.873	0.867	0.871	0.877	0.877	0.878	0.881
	50	10	0.75	0.972	0.872	0.847	0.864	0.864	0.865	0.867	0.868	0.869	0.870	0.874
	50	10	1	0.976	0.875	0.851	0.863	0.866	0.871	0.873	0.873	0.878	0.879	0.877
	50	20	0	0.977	0.875	0.858	0.865	0.872	0.875	0.873	0.871	0.873	0.871	0.876
	50	20	0.25	0.973	0.876	0.856	0.864	0.872	0.873	0.872	0.872	0.876	0.876	0.881
	50	20	0.5	0.975	0.880	0.855	0.866	0.873	0.867	0.871	0.877	0.877	0.878	0.881
	50	20	0.75	0.972	0.872	0.847	0.864	0.864	0.865	0.867	0.868	0.869	0.870	0.874
	50	20	1	0.976	0.875	0.851	0.863	0.866	0.871	0.873	0.873	0.878	0.879	0.877
	50	50	0	0.977	0.875	0.858	0.865	0.872	0.875	0.873	0.871	0.873	0.871	0.876
	50	50	0.25	0.973	0.876	0.856	0.864	0.872	0.873	0.872	0.872	0.876	0.876	0.881
	50	50	0.5	0.975	0.880	0.855	0.866	0.873	0.867	0.871	0.877	0.877	0.878	0.881
	50	50	0.75	0.972	0.872	0.847	0.864	0.864	0.865	0.867	0.868	0.869	0.870	0.874
	50	50	1	0.976	0.875	0.851	0.863	0.866	0.871	0.873	0.873	0.878	0.879	0.877

Table 5.8: Coverage Probabilities of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	2	1	0	0.972	0.889	0.868	0.883	0.888	0.886	0.890	0.888	0.892	0.890	0.891
	2	1	0.25	0.971	0.883	0.866	0.874	0.883	0.886	0.890	0.887	0.887	0.889	0.888
	2	1	0.5	0.972	0.885	0.855	0.874	0.883	0.885	0.881	0.886	0.888	0.892	0.888
	2	1	0.75	0.978	0.892	0.863	0.883	0.887	0.886	0.887	0.884	0.886	0.892	0.891
	2	1	1	0.968	0.895	0.874	0.884	0.893	0.893	0.890	0.899	0.893	0.901	0.900
	2	5	0	0.972	0.889	0.868	0.883	0.888	0.886	0.890	0.888	0.892	0.890	0.891
	2	5	0.25	0.971	0.883	0.866	0.874	0.883	0.886	0.890	0.887	0.887	0.889	0.888
	2	5	0.5	0.972	0.885	0.855	0.874	0.883	0.885	0.881	0.886	0.888	0.892	0.888
	2	5	0.75	0.978	0.892	0.863	0.883	0.887	0.886	0.887	0.884	0.886	0.892	0.891
	2	5	1	0.968	0.895	0.874	0.884	0.893	0.893	0.890	0.899	0.893	0.901	0.900
	2	10	0	0.972	0.889	0.868	0.883	0.888	0.886	0.890	0.888	0.892	0.890	0.891
	2	10	0.25	0.971	0.883	0.866	0.874	0.883	0.886	0.890	0.887	0.887	0.889	0.888
	2	10	0.5	0.972	0.885	0.855	0.874	0.883	0.885	0.881	0.886	0.888	0.892	0.888
	2	10	0.75	0.978	0.892	0.863	0.883	0.887	0.886	0.887	0.884	0.886	0.892	0.891
	2	10	1	0.968	0.895	0.874	0.884	0.893	0.893	0.890	0.899	0.893	0.901	0.900
	2	20	0	0.972	0.889	0.868	0.883	0.888	0.886	0.890	0.888	0.892	0.890	0.891
	2	20	0.25	0.971	0.883	0.866	0.874	0.883	0.886	0.890	0.887	0.887	0.889	0.888
	2	20	0.5	0.972	0.885	0.855	0.874	0.883	0.885	0.881	0.886	0.888	0.892	0.888
	2	20	0.75	0.978	0.892	0.863	0.883	0.887	0.886	0.887	0.884	0.886	0.892	0.891
	2	20	1	0.968	0.895	0.874	0.884	0.893	0.893	0.890	0.899	0.893	0.901	0.900
	2	50	0	0.972	0.889	0.868	0.883	0.888	0.886	0.890	0.888	0.892	0.890	0.891
	2	50	0.25	0.971	0.883	0.866	0.874	0.883	0.886	0.890	0.887	0.887	0.889	0.888
	2	50	0.5	0.972	0.885	0.855	0.874	0.883	0.885	0.881	0.886	0.888	0.892	0.888
	2	50	0.75	0.978	0.892	0.863	0.883	0.887	0.886	0.887	0.884	0.886	0.892	0.891
	2	50	1	0.968	0.895	0.874	0.884	0.893	0.893	0.890	0.899	0.893	0.901	0.900
	5	1	0	0.972	0.900	0.876	0.892	0.897	0.898	0.897	0.900	0.901	0.903	0.897
	5	1	0.25	0.972	0.881	0.862	0.875	0.877	0.883	0.876	0.884	0.882	0.883	0.881
	5	1	0.5	0.977	0.893	0.863	0.883	0.885	0.882	0.890	0.889	0.892	0.890	0.892
	5	1	0.75	0.981	0.860	0.856	0.879	0.879	0.884	0.884	0.886	0.889	0.890	0.887
	5	1	1	0.973	0.883	0.858	0.878	0.881	0.883	0.884	0.878	0.885	0.881	0.887

Table 5.8: (Cont.): Coverage Probabilities of mean for Crack distribution n = 50

(Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	5	5	0	0.972	0.900	0.876	0.892	0.897	0.898	0.897	0.900	0.901	0.903	0.897
	5	5	0.25	0.972	0.881	0.862	0.875	0.877	0.883	0.876	0.884	0.882	0.883	0.881
	5	5	0.5	0.977	0.893	0.863	0.883	0.885	0.882	0.890	0.889	0.892	0.890	0.892
	5	5	0.75	0.981	0.886	0.856	0.879	0.879	0.884	0.884	0.886	0.889	0.890	0.887
	5	5	1	0.973	0.883	0.858	0.878	0.881	0.883	0.884	0.878	0.885	0.881	0.887
	5	10	0	0.972	0.900	0.876	0.892	0.897	0.898	0.897	0.900	0.901	0.903	0.897
	5	10	0.25	0.972	0.881	0.862	0.875	0.877	0.883	0.876	0.884	0.882	0.883	0.881
	5	10	0.5	0.977	0.893	0.863	0.883	0.885	0.882	0.890	0.889	0.892	0.890	0.892
	5	10	0.75	0.981	0.886	0.856	0.879	0.879	0.884	0.884	0.886	0.889	0.890	0.887
	5	10	1	0.973	0.883	0.858	0.878	0.881	0.883	0.884	0.878	0.885	0.881	0.887
	5	20	0	0.972	0.900	0.876	0.892	0.897	0.898	0.897	0.900	0.901	0.903	0.897
	5	20	0.25	0.972	0.881	0.862	0.875	0.877	0.883	0.876	0.884	0.882	0.883	0.881
	5	20	0.5	0.977	0.893	0.863	0.883	0.885	0.882	0.890	0.889	0.892	0.890	0.892
	5	20	0.75	0.981	0.886	0.856	0.879	0.879	0.884	0.884	0.886	0.889	0.890	0.887
	5	20	1	0.973	0.883	0.858	0.878	0.881	0.883	0.884	0.878	0.885	0.881	0.887
	5	50	0	0.972	0.900	0.876	0.892	0.897	0.898	0.897	0.900	0.901	0.903	0.897
	5	50	0.25	0.972	0.881	0.862	0.875	0.877	0.883	0.876	0.884	0.882	0.883	0.881
	5	50	0.5	0.977	0.893	0.863	0.883	0.885	0.882	0.890	0.889	0.892	0.890	0.892
	5	50	0.75	0.981	0.886	0.856	0.879	0.879	0.884	0.884	0.886	0.889	0.890	0.887
	5	50	1	0.973	0.883	0.858	0.878	0.881	0.883	0.884	0.878	0.885	0.881	0.887
	10	1	0	0.980	0.896	0.875	0.885	0.892	0.895	0.895	0.897	0.895	0.900	0.900
	10	1	0.25	0.985	0.891	0.864	0.879	0.885	0.884	0.886	0.892	0.893	0.895	0.898
	10	1	0.5	0.980	0.898	0.871	0.891	0.890	0.898	0.897	0.896	0.902	0.897	0.898
	10	1	0.75	0.982	0.900	0.873	0.888	0.891	0.891	0.892	0.897	0.895	0.896	0.898
	10	1	1	0.981	0.895	0.861	0.886	0.892	0.886	0.889	0.893	0.900	0.897	0.897
	10	5	0	0.980	0.896	0.875	0.885	0.892	0.895	0.895	0.897	0.895	0.900	0.900
	10	5	0.25	0.985	0.891	0.864	0.879	0.885	0.884	0.886	0.892	0.893	0.895	0.898
	10	5	0.5	0.980	0.898	0.871	0.891	0.890	0.898	0.897	0.896	0.902	0.897	0.898
	10	5	0.75	0.982	0.900	0.873	0.888	0.891	0.891	0.892	0.897	0.895	0.896	0.898
	10	5	1	0.981	0.895	0.861	0.886	0.892	0.886	0.889	0.893	0.900	0.897	0.897
	10	10	0	0.980	0.896	0.875	0.885	0.892	0.895	0.895	0.897	0.895	0.900	0.900
	10	10	0.25	0.985	0.891	0.864	0.879	0.885	0.884	0.886	0.892	0.893	0.895	0.898
	10	10	0.5	0.980	0.898	0.871	0.891	0.890	0.898	0.897	0.896	0.902	0.897	0.898
	10	10	0.75	0.982	0.900	0.873	0.888	0.891	0.891	0.892	0.897	0.895	0.896	0.898
	10	10	1	0.981	0.895	0.861	0.886	0.892	0.886	0.889	0.893	0.900	0.897	0.897

Table 5.8 (Cont.): Coverage Probabilities of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	10	20	0	0.980	0.896	0.875	0.885	0.892	0.895	0.895	0.897	0.895	0.900	0.900
	10	20	0.25	0.985	0.891	0.864	0.879	0.885	0.884	0.886	0.892	0.893	0.895	0.898
	10	20	0.5	0.980	0.898	0.871	0.891	0.890	0.898	0.897	0.896	0.902	0.897	0.898
	10	20	0.75	0.982	0.900	0.873	0.888	0.891	0.891	0.892	0.897	0.895	0.896	0.898
	10	20	1	0.981	0.895	0.861	0.886	0.892	0.886	0.889	0.893	0.900	0.897	0.897
	10	50	0	0.980	0.896	0.875	0.885	0.892	0.895	0.895	0.897	0.895	0.900	0.900
	10	50	0.25	0.985	0.891	0.864	0.879	0.885	0.884	0.886	0.892	0.893	0.895	0.898
	10	50	0.5	0.980	0.898	0.871	0.891	0.890	0.898	0.897	0.896	0.902	0.897	0.898
	10	50	0.75	0.982	0.900	0.873	0.888	0.891	0.891	0.892	0.897	0.895	0.896	0.898
	10	50	1	0.981	0.895	0.861	0.886	0.892	0.886	0.889	0.893	0.900	0.897	0.897
	20	1	0	0.983	0.892	0.872	0.884	0.889	0.890	0.891	0.897	0.894	0.897	0.893
	20	1	0.25	0.982	0.898	0.870	0.887	0.889	0.893	0.896	0.892	0.898	0.896	0.897
	20	1	0.5	0.980	0.903	0.877	0.895	0.894	0.899	0.901	0.901	0.904	0.906	0.907
	20	1	0.75	0.985	0.901	0.879	0.896	0.896	0.900	0.898	0.901	0.903	0.904	0.903
	20	1	1	0.979	0.899	0.874	0.891	0.893	0.890	0.892	0.896	0.897	0.902	0.902
	20	5	0	0.983	0.892	0.872	0.884	0.889	0.890	0.891	0.897	0.894	0.897	0.893
	20	5	0.25	0.982	0.898	0.870	0.887	0.889	0.893	0.896	0.892	0.898	0.896	0.897
	20	5	0.5	0.980	0.903	0.877	0.895	0.894	0.899	0.901	0.901	0.904	0.906	0.907
	20	5	0.75	0.985	0.901	0.879	0.896	0.896	0.900	0.898	0.901	0.903	0.904	0.903
	20	5	1	0.979	0.899	0.874	0.891	0.893	0.890	0.892	0.896	0.897	0.902	0.902
	20	10	0	0.983	0.892	0.872	0.884	0.889	0.890	0.891	0.897	0.894	0.897	0.893
	20	10	0.25	0.982	0.898	0.870	0.887	0.889	0.893	0.896	0.892	0.898	0.896	0.897
	20	10	0.5	0.980	0.903	0.877	0.895	0.894	0.899	0.901	0.901	0.904	0.906	0.907
	20	10	0.75	0.985	0.901	0.879	0.896	0.896	0.900	0.898	0.901	0.903	0.904	0.903
	20	10	1	0.979	0.899	0.874	0.891	0.893	0.890	0.892	0.896	0.897	0.902	0.902
	20	20	0	0.983	0.892	0.872	0.884	0.889	0.890	0.891	0.897	0.894	0.897	0.893
	20	20	0.25	0.982	0.898	0.870	0.887	0.889	0.893	0.896	0.892	0.898	0.896	0.897
	20	20	0.5	0.980	0.903	0.877	0.895	0.894	0.899	0.901	0.901	0.904	0.906	0.907
	20	20	0.75	0.985	0.901	0.879	0.896	0.896	0.900	0.898	0.901	0.903	0.904	0.903
	20	20	1	0.979	0.899	0.874	0.891	0.893	0.890	0.892	0.896	0.897	0.902	0.902

Table 5.8 (Cont.): Coverage Probabilities of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	20	50	0	0.983	0.892	0.872	0.884	0.889	0.890	0.891	0.897	0.894	0.897	0.893
	20	50	0.25	0.982	0.898	0.870	0.887	0.889	0.893	0.896	0.892	0.898	0.896	0.897
	20	50	0.5	0.980	0.903	0.877	0.895	0.894	0.899	0.901	0.901	0.904	0.906	0.907
	20	50	0.75	0.985	0.901	0.879	0.896	0.896	0.900	0.898	0.901	0.903	0.904	0.903
	20	50	1	0.979	0.899	0.874	0.891	0.893	0.890	0.892	0.896	0.897	0.902	0.902
	50	1	0	0.979	0.902	0.879	0.892	0.902	0.899	0.899	0.901	0.908	0.907	0.909
	50	1	0.25	0.978	0.901	0.873	0.884	0.892	0.889	0.890	0.898	0.899	0.898	0.904
	50	1	0.5	0.978	0.902	0.880	0.897	0.897	0.897	0.901	0.902	0.905	0.908	0.903
	50	1	0.75	0.977	0.907	0.875	0.896	0.898	0.898	0.898	0.904	0.907	0.910	0.907
	50	1	1	0.979	0.906	0.873	0.891	0.894	0.896	0.897	0.900	0.908	0.907	0.904
	50	5	0	0.979	0.902	0.879	0.892	0.902	0.899	0.899	0.901	0.908	0.907	0.909
	50	5	0.25	0.978	0.901	0.873	0.884	0.892	0.889	0.890	0.898	0.899	0.898	0.904
	50	5	0.5	0.978	0.902	0.880	0.897	0.897	0.897	0.901	0.902	0.905	0.908	0.903
	50	5	0.75	0.977	0.907	0.875	0.986	0.898	0.898	0.898	0.904	0.907	0.910	0.907
	50	5	1	0.979	0.906	0.873	0.891	0.894	0.896	0.897	0.900	0.908	0.907	0.904
	50	10	0	0.979	0.902	0.879	0.892	0.902	0.899	0.899	0.901	0.908	0.907	0.909
	50	10	0.25	0.978	0.901	0.873	0.884	0.892	0.889	0.890	0.898	0.899	0.898	0.904
	50	10	0.5	0.978	0.902	0.880	0.897	0.897	0.897	0.901	0.902	0.905	0.908	0.903
	50	10	0.75	0.977	0.907	0.875	0.896	0.898	0.898	0.898	0.904	0.907	0.910	0.907
	50	10	1	0.979	0.906	0.873	0.891	0.894	0.896	0.897	0.900	0.908	0.907	0.904
	50	20	0	0.979	0.902	0.879	0.892	0.902	0.990	0.899	0.901	0.908	0.907	0.909
	50	20	0.25	0.978	0.901	0.873	0.884	0.892	0.889	0.890	0.898	0.899	0.898	0.904
	50	20	0.5	0.978	0.902	0.880	0.897	0.897	0.897	0.901	0.902	0.905	0.908	0.903
	50	20	0.75	0.977	0.907	0.875	0.896	0.898	0.898	0.898	0.904	0.907	0.910	0.907
	50	20	1	0.979	0.906	0.873	0.891	0.894	0.896	0.897	0.900	0.908	0.907	0.904
	50	50	0	0.979	0.902	0.879	0.892	0.902	0.899	0.899	0.901	0.908	0.907	0.909
	50	50	0.25	0.978	0.901	0.873	0.884	0.892	0.889	0.890	0.898	0.899	0.898	0.904
	50	50	0.5	0.978	0.902	0.880	0.897	0.897	0.897	0.901	0.902	0.905	0.908	0.903
	50	50	0.75	0.977	0.907	0.875	0.896	0.898	0.898	0.898	0.904	0.907	0.910	0.907
	50	50	1	0.979	0.906	0.873	0.891	0.894	0.896	0.897	0.900	0.908	0.907	0.904

Table 5.8 (Cont.): Coverage Probabilities of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	2	1	0	0.972	0.889	0.876	0.887	0.891	0.889	0.891	0.890	0.892	0.890	0.891
	2	1	0.25	0.971	0.883	0.872	0.881	0.887	0.888	0.890	0.889	0.887	0.889	0.888
	2	1	0.5	0.972	0.885	0.870	0.877	0.885	0.885	0.885	0.887	0.890	0.892	0.888
	2	1	0.75	0.978	0.892	0.876	0.887	0.890	0.887	0.890	0.885	0.880	0.892	0.891
	2	1	1	0.968	0.895	0.882	0.888	0.896	0.894	0.892	0.899	0.894	0.901	0.900
	2	5	0	0.972	0.889	0.876	0.887	0.891	0.889	0.891	0.890	0.892	0.890	0.891
	2	5	0.25	0.971	0.883	0.872	0.881	0.887	0.888	0.890	0.889	0.887	0.889	0.888
	2	5	0.5	0.972	0.885	0.870	0.877	0.885	0.885	0.885	0.887	0.890	0.892	0.888
	2	5	0.75	0.978	0.892	0.876	0.887	0.890	0.887	0.890	0.885	0.888	0.892	0.891
	2	5	1	0.968	0.895	0.882	0.888	0.896	0.894	0.892	0.899	0.894	0.901	0.900
	2	10	0	0.972	0.889	0.876	0.887	0.891	0.889	0.891	0.890	0.892	0.890	0.891
	2	10	0.25	0.971	0.883	0.872	0.881	0.887	0.888	0.890	0.889	0.887	0.889	0.888
0.85	2	10	0.5	0.972	0.885	0.870	0.877	0.885	0.885	0.885	0.887	0.890	0.892	0.888
	2	10	0.75	0.978	0.892	0.876	0.887	0.890	0.887	0.890	0.885	0.888	0.892	0.891
	2	10	1	0.968	0.895	0.882	0.888	0.896	0.894	0.892	0.899	0.894	0.901	0.900
	2	20	0	0.972	0.889	0.876	0.887	0.891	0.889	0.891	0.890	0.892	0.890	0.891
	2	20	0.25	0.971	0.883	0.872	0.881	0.887	0.888	0.890	0.889	0.887	0.889	0.888
	2	20	0.5	0.972	0.885	0.870	0.877	0.885	0.885	0.885	0.887	0.890	0.892	0.888
	2	20	0.75	0.978	0.892	0.876	0.887	0.890	0.887	0.890	0.885	0.888	0.892	0.891
	2	20	1	0.968	0.895	0.882	0.888	0.896	0.894	0.892	0.899	0.894	0.901	0.900
	2	50	0	0.972	0.889	0.876	0.887	0.891	0.889	0.891	0.890	0.892	0.890	0.891
	2	50	0.25	0.971	0.883	0.872	0.881	0.887	0.888	0.890	0.889	0.887	0.889	0.888
	2	50	0.5	0.972	0.885	0.870	0.877	0.885	0.885	0.885	0.887	0.890	0.892	0.888
	2	50	0.75	0.978	0.892	0.876	0.887	0.890	0.887	0.890	0.885	0.888	0.892	0.891
	2	50	1	0.968	0.895	0.882	0.888	0.896	0.894	0.892	0.899	0.894	0.901	0.900

Table 5.8 (Cont.): Coverage Probabilities of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	5	1	0	0.972	0.900	0.889	0.895	0.901	0.899	0.898	0.900	0.901	0.903	0.897
	5	1	0.25	0.972	0.881	0.869	0.878	0.880	0.883	0.880	0.884	0.882	0.883	0.881
	5	1	0.5	0.977	0.893	0.872	0.886	0.892	0.885	0.891	0.890	0.893	0.890	0.892
	5	1	0.75	0.981	0.886	0.869	0.880	0.882	0.885	0.891	0.888	0.890	0.890	0.887
	5	1	1	0.973	0.883	0.869	0.881	0.881	0.886	0.884	0.881	0.886	0.881	0.887
	5	5	0	0.972	0.900	0.889	0.895	0.901	0.899	0.898	0.900	0.901	0.903	0.897
	5	5	0.25	0.972	0.881	0.869	0.878	0.880	0.883	0.880	0.884	0.882	0.883	0.881
	5	5	0.5	0.977	0.893	0.872	0.886	0.892	0.885	0.891	0.890	0.893	0.890	0.892
	5	5	0.75	0.981	0.886	0.869	0.880	0.882	0.885	0.891	0.888	0.890	0.890	0.887
	5	5	1	0.973	0.883	0.869	0.881	0.881	0.886	0.884	0.881	0.886	0.881	0.887
	5	10	0	0.972	0.900	0.889	0.895	0.901	0.899	0.898	0.900	0.901	0.903	0.897
	5	10	0.25	0.972	0.881	0.869	0.878	0.880	0.883	0.880	0.884	0.882	0.883	0.881
	5	10	0.5	0.977	0.893	0.872	0.886	0.892	0.885	0.891	0.890	0.893	0.890	0.892
	5	10	0.75	0.981	0.886	0.869	0.880	0.882	0.885	0.891	0.888	0.890	0.890	0.887
	5	10	1	0.973	0.883	0.869	0.881	0.881	0.886	0.884	0.881	0.886	0.881	0.887
	5	20	0	0.972	0.900	0.889	0.895	0.901	0.899	0.898	0.900	0.901	0.903	0.897
	5	20	0.25	0.972	0.881	0.869	0.878	0.880	0.883	0.880	0.884	0.882	0.883	0.881
0.85	5	20	0.5	0.977	0.893	0.872	0.886	0.892	0.885	0.891	0.890	0.893	0.890	0.892
	5	20	0.75	0.981	0.886	0.869	0.880	0.882	0.885	0.891	0.888	0.890	0.890	0.887
	5	20	1	0.973	0.883	0.869	0.881	0.881	0.886	0.884	0.881	0.886	0.881	0.887
	5	50	0	0.972	0.900	0.889	0.895	0.901	0.899	0.898	0.900	0.901	0.903	0.897
	5	50	0.25	0.972	0.881	0.869	0.878	0.880	0.883	0.880	0.884	0.882	0.883	0.881
	5	50	0.5	0.977	0.893	0.872	0.886	0.892	0.885	0.891	0.890	0.893	0.890	0.892
	5	50	0.75	0.981	0.886	0.869	0.880	0.882	0.885	0.891	0.888	0.890	0.890	0.887
	5	50	1	0.973	0.883	0.869	0.881	0.881	0.886	0.884	0.881	0.886	0.881	0.887
	10	1	0	0.980	0.896	0.882	0.890	0.897	0.897	0.895	0.897	0.896	0.900	0.900
	10	1	0.25	0.985	0.891	0.878	0.889	0.889	0.887	0.891	0.894	0.893	0.895	0.898
	10	1	0.5	0.980	0.898	0.885	0.896	0.895	0.901	0.902	0.899	0.903	0.897	0.898
	10	1	0.75	0.982	0.900	0.883	0.894	0.894	0.894	0.896	0.897	0.899	0.896	0.898
	10	1	1	0.981	0.895	0.878	0.889	0.893	0.887	0.894	0.896	0.900	0.897	0.897
	10	5	0	0.980	0.896	0.882	0.890	0.897	0.897	0.895	0.897	0.896	0.900	0.900
	10	5	0.25	0.985	0.891	0.878	0.889	0.889	0.887	0.891	0.894	0.893	0.895	0.898
	10	5	0.5	0.980	0.898	0.885	0.896	0.895	0.901	0.902	0.899	0.903	0.897	0.898
	10	5	0.75	0.982	0.900	0.883	0.894	0.894	0.894	0.896	0.897	0.899	0.896	0.898
	10	5	1	0.981	0.895	0.878	0.889	0.893	0.887	0.894	0.896	0.900	0.897	0.897

Table 5.8 (Cont.): Coverage Probabilities of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	10	10	0	0.980	0.896	0.882	0.890	0.897	0.897	0.895	0.897	0.896	0.900	0.900
	10	10	0.25	0.985	0.891	0.878	0.889	0.889	0.887	0.891	0.894	0.893	0.895	0.898
	10	10	0.5	0.980	0.898	0.885	0.896	0.895	0.901	0.902	0.899	0.903	0.897	0.898
	10	10	0.75	0.982	0.900	0.883	0.894	0.894	0.894	0.896	0.897	0.899	0.896	0.898
	10	10	1	0.981	0.895	0.878	0.889	0.893	0.887	0.894	0.896	0.900	0.897	0.897
	10	20	0	0.980	0.896	0.882	0.890	0.897	0.897	0.895	0.897	0.896	0.900	0.900
	10	20	0.25	0.985	0.891	0.878	0.889	0.889	0.887	0.891	0.894	0.893	0.895	0.898
	10	20	0.5	0.980	0.898	0.885	0.896	0.895	0.901	0.902	0.899	0.903	0.897	0.898
	10	20	0.75	0.982	0.900	0.883	0.894	0.894	0.894	0.896	0.897	0.899	0.896	0.898
	10	20	1	0.981	0.895	0.878	0.889	0.893	0.887	0.894	0.896	0.900	0.897	0.897
	10	50	0	0.980	0.896	0.882	0.890	0.897	0.897	0.895	0.897	0.896	0.900	0.900
	10	50	0.25	0.985	0.891	0.878	0.889	0.889	0.887	0.891	0.894	0.893	0.895	0.898
	10	50	0.5	0.980	0.898	0.885	0.896	0.895	0.901	0.902	0.899	0.903	0.897	0.898
	10	50	0.75	0.982	0.900	0.883	0.894	0.894	0.894	0.896	0.897	0.899	0.896	0.898
	10	50	1	0.981	0.895	0.878	0.889	0.893	0.887	0.894	0.896	0.900	0.897	0.897
	20	1	0	0.983	0.892	0.884	0.889	0.893	0.896	0.892	0.897	0.895	0.897	0.893
	20	1	0.25	0.982	0.898	0.883	0.891	0.891	0.894	0.898	0.893	0.898	0.896	0.897
0.85	20	1	0.5	0.980	0.903	0.889	0.900	0.897	0.900	0.904	0.902	0.905	0.906	0.907
	20	1	0.75	0.985	0.901	0.886	0.898	0.899	0.902	0.901	0.901	0.904	0.904	0.903
	20	1	1	0.979	0.899	0.887	0.896	0.896	0.890	0.896	0.896	0.900	0.902	0.902
	20	5	0	0.983	0.892	0.884	0.889	0.893	0.896	0.892	0.897	0.895	0.897	0.893
	20	5	0.25	0.982	0.898	0.883	0.891	0.891	0.894	0.898	0.893	0.898	0.896	0.897
	20	5	0.5	0.980	0.903	0.889	0.900	0.897	0.900	0.904	0.902	0.905	0.906	0.907
	20	5	0.75	0.985	0.901	0.886	0.898	0.899	0.902	0.901	0.901	0.904	0.904	0.903
	20	5	1	0.979	0.899	0.887	0.896	0.896	0.890	0.896	0.896	0.900	0.902	0.902
	20	10	0	0.983	0.892	0.884	0.889	0.893	0.896	0.892	0.897	0.895	0.897	0.893
	20	10	0.25	0.982	0.898	0.883	0.891	0.891	0.894	0.898	0.893	0.898	0.896	0.897
	20	10	0.5	0.980	0.903	0.889	0.900	0.897	0.900	0.904	0.902	0.905	0.906	0.907
	20	10	0.75	0.985	0.901	0.886	0.898	0.899	0.902	0.901	0.901	0.904	0.904	0.903
	20	10	1	0.979	0.899	0.887	0.896	0.896	0.890	0.896	0.896	0.900	0.902	0.902
	20	20	0	0.983	0.892	0.884	0.889	0.893	0.896	0.892	0.897	0.895	0.897	0.893
	20	20	0.25	0.982	0.898	0.883	0.891	0.891	0.894	0.898	0.893	0.898	0.896	0.897
	20	20	0.5	0.980	0.903	0.889	0.900	0.897	0.900	0.904	0.902	0.905	0.906	0.907
	20	20	0.75	0.985	0.901	0.886	0.898	0.899	0.902	0.901	0.901	0.904	0.904	0.903
	20	20	1	0.979	0.899	0.887	0.896	0.896	0.890	0.896	0.896	0.900	0.902	0.902

Table 5.8 (Cont.): Coverage Probabilities of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.85	20	50	0	0.983	0.892	0.884	0.889	0.893	0.896	0.892	0.897	0.895	0.897	0.893
	20	50	0.25	0.982	0.898	0.883	0.891	0.891	0.894	0.898	0.893	0.898	0.896	0.897
	20	50	0.5	0.980	0.903	0.889	0.900	0.897	0.900	0.904	0.902	0.905	0.906	0.907
	20	50	0.75	0.985	0.901	0.886	0.898	0.899	0.902	0.901	0.901	0.904	0.904	0.903
	20	50	1	0.979	0.899	0.887	0.896	0.896	0.890	0.896	0.896	0.900	0.902	0.902
	50	1	0	0.979	0.902	0.891	0.895	0.904	0.903	0.903	0.902	0.908	0.907	0.909
	50	1	0.25	0.978	0.901	0.881	0.890	0.895	0.896	0.892	0.898	0.901	0.898	0.904
	50	1	0.5	0.978	0.902	0.889	0.900	0.901	0.902	0.905	0.903	0.905	0.908	0.903
	50	1	0.75	0.977	0.907	0.887	0.900	0.904	0.906	0.899	0.905	0.907	0.910	0.907
	50	1	1	0.979	0.906	0.881	0.895	0.899	0.899	0.902	0.906	0.909	0.907	0.904
	50	5	0	0.979	0.902	0.981	0.895	0.904	0.903	0.903	0.902	0.908	0.907	0.909
	50	5	0.25	0.978	0.901	0.881	0.890	0.895	0.896	0.892	0.898	0.901	0.898	0.904
	50	5	0.5	0.978	0.902	0.889	0.900	0.901	0.902	0.905	0.903	0.905	0.908	0.903
	50	5	0.75	0.977	0.907	0.887	0.900	0.904	0.906	0.899	0.905	0.907	0.910	0.907
	50	5	1	0.979	0.906	0.881	0.895	0.899	0.899	0.902	0.906	0.909	0.907	0.904
	50	10	0	0.979	0.902	0.891	0.895	0.904	0.903	0.903	0.902	0.908	0.907	0.909
	50	10	0.25	0.978	0.901	0.881	0.890	0.895	0.896	0.892	0.898	0.901	0.898	0.904
	50	10	0.5	0.978	0.902	0.889	0.900	0.901	0.902	0.905	0.903	0.905	0.908	0.903
	50	10	0.75	0.977	0.907	0.887	0.900	0.904	0.906	0.899	0.905	0.907	0.910	0.907
	50	10	1	0.979	0.906	0.881	0.895	0.899	0.899	0.902	0.906	0.909	0.907	0.904
	50	20	0	0.979	0.902	0.891	0.895	0.904	0.903	0.903	0.902	0.908	0.907	0.909
	50	20	0.25	0.978	0.901	0.881	0.890	0.895	0.896	0.892	0.898	0.901	0.898	0.904
	50	20	0.5	0.978	0.902	0.889	0.900	0.901	0.902	0.905	0.903	0.905	0.908	0.903
	50	20	0.75	0.977	0.907	0.887	0.900	0.904	0.906	0.899	0.905	0.907	0.910	0.907
	50	20	1	0.979	0.906	0.881	0.895	0.899	0.899	0.902	0.906	0.909	0.907	0.904
	50	50	0	0.979	0.902	0.891	0.895	0.904	0.903	0.903	0.902	0.908	0.907	0.909
	50	50	0.25	0.978	0.901	0.881	0.890	0.895	0.896	0.892	0.898	0.901	0.898	0.904
	50	50	0.5	0.978	0.902	0.889	0.900	0.901	0.902	0.905	0.903	0.905	0.908	0.903
	50	50	0.75	0.977	0.907	0.887	0.900	0.904	0.906	0.899	0.905	0.907	0.910	0.907
	50	50	1	0.979	0.906	0.881	0.895	0.899	0.899	0.902	0.906	0.909	0.907	0.904

Table 5.9: Coverage Probabilities of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	2	1	0	0.981	0.911	0.877	0.892	0.900	0.904	0.908	0.909	0.905	0.910	0.911
	2	1	0.25	0.979	0.902	0.881	0.896	0.901	0.899	0.903	0.905	0.903	0.904	0.906
	2	1	0.5	0.977	0.908	0.891	0.901	0.899	0.901	0.903	0.906	0.902	0.909	0.906
	2	1	0.75	0.974	0.907	0.880	0.892	0.899	0.901	0.900	0.902	0.903	0.906	0.906
	2	1	1	0.982	0.902	0.872	0.888	0.890	0.900	0.897	0.900	0.902	0.897	0.905
	2	5	0	0.981	0.911	0.877	0.892	0.900	0.904	0.908	0.909	0.905	0.910	0.911
	2	5	0.25	0.979	0.902	0.881	0.896	0.901	0.899	0.903	0.905	0.903	0.904	0.906
	2	5	0.5	0.977	0.908	0.891	0.901	0.899	0.901	0.903	0.906	0.902	0.909	0.906
	2	5	0.75	0.974	0.907	0.880	0.892	0.899	0.901	0.900	0.902	0.903	0.906	0.906
	2	5	1	0.982	0.902	0.872	0.888	0.890	0.900	0.897	0.900	0.902	0.897	0.905
	2	10	0	0.981	0.911	0.877	0.892	0.900	0.904	0.908	0.909	0.905	0.910	0.911
	2	10	0.25	0.979	0.902	0.881	0.896	0.901	0.899	0.903	0.905	0.903	0.904	0.906
	2	10	0.5	0.977	0.908	0.891	0.901	0.899	0.901	0.903	0.906	0.902	0.909	0.906
	2	10	0.75	0.974	0.907	0.880	0.892	0.899	0.901	0.900	0.902	0.903	0.906	0.906
	2	10	1	0.982	0.902	0.872	0.888	0.890	0.900	0.897	0.900	0.902	0.897	0.905
	2	20	0	0.981	0.911	0.877	0.892	0.900	0.904	0.908	0.909	0.905	0.910	0.911
	2	20	0.25	0.979	0.902	0.881	0.896	0.901	0.899	0.903	0.905	0.903	0.904	0.906
	2	20	0.5	0.977	0.908	0.891	0.901	0.899	0.901	0.903	0.906	0.902	0.909	0.906
	2	20	0.75	0.974	0.907	0.880	0.892	0.899	0.901	0.900	0.902	0.903	0.906	0.906
	2	20	1	0.982	0.902	0.872	0.888	0.890	0.900	0.897	0.900	0.902	0.897	0.905
	2	50	0	0.981	0.911	0.877	0.892	0.900	0.904	0.908	0.909	0.905	0.910	0.911
	2	50	0.25	0.979	0.902	0.881	0.896	0.901	0.899	0.903	0.905	0.903	0.904	0.906
	2	50	0.5	0.977	0.908	0.891	0.901	0.899	0.901	0.903	0.906	0.902	0.909	0.906
	2	50	0.75	0.974	0.907	0.880	0.892	0.899	0.901	0.900	0.902	0.903	0.906	0.906
	2	50	1	0.982	0.902	0.872	0.888	0.890	0.900	0.897	0.900	0.902	0.897	0.905
	5	1	0	0.983	0.918	0.896	0.906	0.914	0.918	0.915	0.914	0.916	0.918	0.919
	5	1	0.25	0.982	0.922	0.890	0.908	0.912	0.917	0.914	0.921	0.917	0.920	0.921
	5	1	0.5	0.981	0.922	0.900	0.914	0.919	0.919	0.918	0.920	0.920	0.924	0.921
	5	1	0.75	0.981	0.909	0.888	0.902	0.912	0.911	0.912	0.910	0.916	0.914	0.911
	5	1	1	0.980	0.914	0.888	0.901	0.906	0.911	0.906	0.911	0.910	0.914	0.915

Table 5.9 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	5	5	0	0.983	0.918	0.896	0.906	0.914	0.918	0.915	0.914	0.916	0.918	0.919
	5	5	0.25	0.982	0.922	0.890	0.908	0.912	0.917	0.914	0.921	0.917	0.920	0.921
	5	5	0.5	0.981	0.922	0.900	0.914	0.919	0.919	0.918	0.920	0.920	0.924	0.921
	5	5	0.75	0.981	0.909	0.888	0.902	0.912	0.911	0.912	0.910	0.916	0.914	0.911
	5	5	1	0.980	0.914	0.888	0.901	0.906	0.911	0.906	0.911	0.910	0.914	0.915
	5	10	0	0.983	0.918	0.896	0.906	0.914	0.918	0.915	0.914	0.916	0.918	0.919
	5	10	0.25	0.982	0.922	0.890	0.908	0.912	0.917	0.914	0.921	0.917	0.920	0.921
	5	10	0.5	0.981	0.922	0.900	0.914	0.919	0.919	0.918	0.920	0.920	0.924	0.921
	5	10	0.75	0.981	0.909	0.888	0.902	0.912	0.911	0.912	0.910	0.916	0.914	0.911
	5	10	1	0.980	0.914	0.888	0.904	0.906	0.911	0.906	0.911	0.910	0.914	0.915
	5	20	0	0.983	0.918	0.896	0.906	0.914	0.918	0.915	0.914	0.916	0.918	0.919
	5	20	0.25	0.982	0.922	0.890	0.908	0.912	0.917	0.914	0.921	0.917	0.920	0.921
	5	20	0.5	0.981	0.922	0.900	0.914	0.919	0.919	0.918	0.920	0.920	0.924	0.921
	5	20	0.75	0.981	0.909	0.888	0.902	0.912	0.911	0.912	0.910	0.916	0.914	0.911
	5	20	1	0.980	0.914	0.888	0.901	0.906	0.911	0.906	0.911	0.910	0.914	0.915
	5	50	0	0.983	0.918	0.896	0.906	0.914	0.918	0.915	0.914	0.916	0.918	0.919
	5	50	0.25	0.982	0.922	0.890	0.908	0.912	0.917	0.914	0.921	0.917	0.920	0.921
0.75	5	50	0.5	0.981	0.922	0.900	0.914	0.919	0.919	0.918	0.920	0.920	0.924	0.921
	5	50	0.75	0.981	0.909	0.888	0.902	0.912	0.911	0.912	0.910	0.916	0.914	0.911
	5	50	1	0.980	0.914	0.888	0.901	0.906	0.911	0.906	0.911	0.910	0.914	0.915
	10	1	0	0.986	0.920	0.898	0.910	0.915	0.918	0.914	0.916	0.921	0.923	0.917
	10	1	0.25	0.981	0.903	0.887	0.900	0.902	0.905	0.905	0.908	0.908	0.910	0.909
	10	1	0.5	0.984	0.915	0.891	0.904	0.908	0.911	0.912	0.913	0.913	0.911	0.911
	10	1	0.75	0.982	0.904	0.888	0.900	0.903	0.905	0.904	0.907	0.908	0.908	0.908
	10	1	1	0.982	0.914	0.889	0.906	0.912	0.910	0.913	0.910	0.920	0.918	0.915
	10	5	0	0.986	0.920	0.898	0.910	0.915	0.918	0.914	0.916	0.921	0.923	0.917
	10	5	0.25	0.981	0.903	0.887	0.900	0.902	0.905	0.905	0.908	0.908	0.910	0.909
	10	5	0.5	0.984	0.915	0.891	0.904	0.908	0.911	0.912	0.913	0.913	0.911	0.911
	10	5	0.75	0.982	0.904	0.888	0.900	0.903	0.905	0.904	0.907	0.908	0.908	0.908
	10	5	1	0.982	0.914	0.889	0.906	0.912	0.910	0.913	0.910	0.920	0.918	0.915
	10	10	0	0.986	0.920	0.898	0.910	0.915	0.918	0.914	0.916	0.921	0.923	0.917
	10	10	0.25	0.981	0.903	0.887	0.900	0.902	0.905	0.905	0.908	0.908	0.910	0.909
	10	10	0.5	0.984	0.915	0.891	0.904	0.908	0.911	0.912	0.913	0.913	0.911	0.911
	10	10	0.75	0.982	0.904	0.888	0.900	0.903	0.905	0.904	0.907	0.908	0.908	0.908
	10	10	1	0.982	0.914	0.889	0.906	0.912	0.910	0.913	0.910	0.920	0.918	0.915

Table 5.9 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	10	20	0	0.986	0.920	0.898	0.910	0.915	0.918	0.914	0.916	0.921	0.923	0.917
	10	20	0.25	0.981	0.903	0.887	0.900	0.902	0.905	0.905	0.908	0.908	0.910	0.909
	10	20	0.5	0.984	0.915	0.891	0.904	0.908	0.911	0.912	0.913	0.913	0.911	0.911
	10	20	0.75	0.982	0.904	0.888	0.900	0.903	0.905	0.904	0.907	0.908	0.908	0.908
	10	20	1	0.982	0.914	0.889	0.906	0.912	0.910	0.913	0.910	0.920	0.918	0.915
	10	50	0	0.986	0.920	0.898	0.910	0.915	0.918	0.914	0.916	0.921	0.923	0.917
	10	50	0.25	0.981	0.903	0.887	0.900	0.902	0.905	0.905	0.908	0.908	0.910	0.909
	10	50	0.5	0.984	0.915	0.891	0.904	0.908	0.911	0.912	0.913	0.913	0.911	0.911
	10	50	0.75	0.982	0.904	0.888	0.900	0.903	0.905	0.904	0.907	0.908	0.908	0.908
	10	50	1	0.982	0.914	0.889	0.906	0.912	0.910	0.913	0.910	0.920	0.918	0.915
	20	1	0	0.986	0.916	0.888	0.904	0.904	0.913	0.912	0.916	0.915	0.915	0.918
	20	1	0.25	0.983	0.910	0.882	0.898	0.902	0.906	0.905	0.906	0.908	0.907	0.908
	20	1	0.5	0.982	0.909	0.879	0.899	0.897	0.902	0.902	0.909	0.906	0.905	0.910
	20	1	0.75	0.980	0.905	0.878	0.893	0.899	0.907	0.905	0.905	0.907	0.908	0.911
	20	1	1	0.980	0.910	0.891	0.899	0.902	0.907	0.906	0.911	0.907	0.907	0.911
	20	5	0	0.980	0.905	0.878	0.893	0.899	0.907	0.905	0.905	0.907	0.908	0.911
	20	5	0.25	0.983	0.910	0.882	0.898	0.902	0.906	0.905	0.906	0.908	0.907	0.908
	20	5	0.5	0.982	0.909	0.879	0.899	0.897	0.902	0.902	0.909	0.906	0.905	0.910
	20	5	0.75	0.980	0.905	0.878	0.893	0.899	0.907	0.905	0.905	0.907	0.908	0.911
	20	5	1	0.980	0.910	0.891	0.899	0.902	0.907	0.906	0.911	0.907	0.907	0.911
	20	10	0	0.986	0.916	0.888	0.904	0.904	0.913	0.912	0.916	0.915	0.915	0.918
	20	10	0.25	0.983	0.910	0.882	0.898	0.902	0.906	0.905	0.906	0.908	0.907	0.908
	20	10	0.5	0.982	0.909	0.879	0.899	0.897	0.902	0.902	0.909	0.906	0.905	0.910
	20	10	0.75	0.980	0.906	0.878	0.893	0.899	0.907	0.905	0.905	0.907	0.908	0.911
	20	10	1	0.980	0.910	0.891	0.899	0.902	0.907	0.906	0.911	0.907	0.907	0.911
	20	20	0	0.986	0.916	0.888	0.904	0.904	0.913	0.912	0.916	0.915	0.915	0.918
	20	20	0.25	0.983	0.910	0.882	0.898	0.902	0.906	0.905	0.906	0.908	0.907	0.908
	20	20	0.5	0.982	0.909	0.879	0.899	0.897	0.902	0.902	0.909	0.906	0.905	0.910
	20	20	0.75	0.980	0.905	0.878	0.893	0.899	0.907	0.905	0.905	0.907	0.908	0.911
	20	20	1	0.980	0.910	0.891	0.899	0.902	0.907	0.906	0.911	0.907	0.907	0.911

Table 5.9 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	20	50	0	0.986	0.916	0.888	0.904	0.904	0.913	0.912	0.916	0.915	0.915	0.918
	20	50	0.25	0.983	0.910	0.882	0.989	0.902	0.906	0.905	0.906	0.908	0.907	0.908
	20	50	0.5	0.982	0.909	0.879	0.899	0.897	0.902	0.902	0.909	0.906	0.905	0.910
	20	50	0.75	0.980	0.905	0.878	0.893	0.899	0.907	0.905	0.905	0.907	0.908	0.911
	20	50	1	0.980	0.910	0.891	0.899	0.902	0.907	0.906	0.911	0.907	0.907	0.911
	50	1	0	0.985	0.912	0.886	0.902	0.901	0.912	0.908	0.908	0.910	0.910	0.914
	50	1	0.25	0.987	0.904	0.881	0.894	0.897	0.898	0.900	0.900	0.901	0.904	0.910
	50	1	0.5	0.987	0.906	0.877	0.893	0.898	0.898	0.899	0.900	0.902	0.899	0.905
	50	1	0.75	0.983	0.906	0.884	0.902	0.900	0.907	0.908	0.904	0.907	0.911	0.913
	50	1	1	0.982	0.903	0.879	0.890	0.899	0.899	0.901	0.903	0.901	0.904	908.000
	50	5	0	0.985	0.912	0.886	0.902	0.901	0.912	0.908	0.908	0.910	0.910	0.914
	50	5	0.25	0.987	0.904	0.881	0.894	0.897	0.898	0.900	0.900	0.901	0.904	0.910
	50	5	0.5	0.987	0.906	0.877	0.893	0.898	0.898	0.899	0.900	0.902	0.899	0.905
	50	5	0.75	0.983	0.906	0.884	0.902	0.900	0.907	0.908	0.904	0.907	0.911	0.913
	50	5	1	0.982	0.903	0.879	0.890	0.899	0.899	0.901	0.903	0.901	0.904	0.908
	50	10	0	0.985	0.912	0.886	0.902	0.901	0.912	0.908	0.908	0.910	0.910	0.914
	50	10	0.25	0.987	0.904	0.881	0.894	0.897	0.989	0.900	0.900	0.901	0.904	0.910
	50	10	0.5	0.987	0.906	0.877	0.893	0.898	0.898	0.899	0.900	0.902	0.899	0.905
	50	10	0.75	0.983	0.906	0.884	0.902	0.900	0.907	0.908	0.904	0.907	0.911	0.913
	50	10	1	0.982	0.903	0.879	0.890	0.899	0.899	0.901	0.903	0.901	0.904	0.908
	50	20	0	0.985	0.912	0.886	0.902	0.901	0.912	0.908	0.908	0.910	0.910	0.914
	50	20	0.25	0.987	0.904	0.881	0.894	0.897	0.898	0.900	0.900	0.901	0.904	0.910
	50	20	0.5	0.987	0.906	0.877	0.893	0.898	0.898	0.899	0.900	0.902	0.899	0.905
	50	20	0.75	0.983	0.906	0.884	0.902	0.900	0.907	0.908	0.904	0.907	0.911	0.913
	50	20	1	0.982	0.903	0.879	0.890	0.899	0.899	0.901	0.903	0.901	0.904	0.908
	50	50	0	0.985	0.912	0.886	0.902	0.901	0.912	0.908	0.908	0.910	0.910	0.914
	50	50	0.25	0.987	0.904	0.881	0.894	0.897	0.898	0.900	0.900	0.901	0.904	0.910
	50	50	0.5	0.987	0.906	0.877	0.893	0.898	0.898	0.899	0.900	0.902	0.899	0.905
	50	50	0.75	0.983	0.906	0.884	0.902	0.900	0.907	0.908	0.904	0.907	0.911	0.913
	50	50	1	0.982	0.903	0.879	0.890	0.899	0.899	0.901	0.903	0.901	0.904	0.908

Table 5.9 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	2	1	0	0.981	0.911	0.887	0.896	0.902	0.906	0.913	0.910	0.905	0.910	0.911
	2	1	0.25	0.979	0.902	0.891	0.902	0.903	0.903	0.905	0.908	0.903	0.904	0.906
	2	1	0.5	0.977	0.908	0.896	0.902	0.900	0.903	0.905	0.907	0.905	0.909	0.906
	2	1	0.75	0.974	0.907	0.892	0.897	0.903	0.905	0.904	0.904	0.905	0.906	0.906
	2	1	1	0.982	0.902	0.881	0.893	0.896	0.903	0.898	0.903	0.903	0.897	0.905
	2	5	0	0.981	0.911	0.887	0.896	0.902	0.906	0.913	0.910	0.905	0.910	0.911
	2	5	0.25	0.979	0.902	0.891	0.902	0.903	0.903	0.905	0.908	0.903	0.904	0.906
	2	5	0.5	0.977	0.908	0.896	0.902	0.900	0.903	0.905	0.907	0.905	0.909	0.906
	2	5	0.75	0.974	0.907	0.892	0.897	0.903	0.905	0.904	0.904	0.905	0.906	0.906
	2	5	1	0.982	0.902	0.881	0.893	0.896	0.903	0.898	0.903	0.903	0.897	0.905
	2	10	0	0.981	0.911	0.887	0.896	0.902	0.906	0.913	0.910	0.905	0.910	0.911
	2	10	0.25	0.979	0.902	0.891	0.902	0.903	0.903	0.905	0.908	0.903	0.904	0.906
0.85	2	10	0.5	0.977	0.908	0.896	0.902	0.900	0.903	0.905	0.907	0.905	0.909	0.906
	2	10	0.75	0.974	0.907	0.892	0.897	0.903	0.905	0.904	0.904	0.905	0.906	0.906
	2	10	1	0.982	0.902	0.881	0.893	0.896	0.903	0.898	0.903	0.903	0.897	0.905
	2	20	0	0.981	0.911	0.887	0.896	0.902	0.906	0.913	0.910	0.905	0.910	0.911
	2	20	0.25	0.979	0.902	0.891	0.902	0.903	0.903	0.905	0.908	0.903	0.904	0.906
	2	20	0.5	0.977	0.908	0.896	0.902	0.900	0.903	0.905	0.907	0.905	0.909	0.906
	2	20	0.75	0.974	0.907	0.892	0.897	0.903	0.905	0.904	0.904	0.905	0.906	0.906
	2	20	1	0.982	0.902	0.881	0.893	0.896	0.903	0.898	0.903	0.903	0.897	0.905
	2	50	0	0.981	0.911	0.887	0.896	0.902	0.906	0.913	0.910	0.905	0.910	0.911
	2	50	0.25	0.979	0.902	0.891	0.902	0.903	0.903	0.905	0.908	0.903	0.904	0.906
	2	50	0.5	0.977	0.908	0.896	0.902	0.900	0.903	0.905	0.907	0.905	0.909	0.906
	2	50	0.75	0.974	0.907	0.892	0.897	0.903	0.905	0.904	0.904	0.905	0.906	0.906
	2	50	1	0.982	0.902	0.881	0.893	0.896	0.903	0.898	0.903	0.903	0.897	0.905

Table 5.9 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	5	1	0	0.983	0.918	0.906	0.909	0.917	0.919	0.917	0.915	0.917	0.918	0.919
	5	1	0.25	0.982	0.922	0.904	0.910	0.913	0.920	0.914	0.923	0.918	0.920	0.921
	5	1	0.5	0.981	0.922	0.909	0.918	0.921	0.919	0.920	0.920	0.921	0.924	0.921
	5	1	0.75	0.981	0.909	0.901	0.905	0.914	0.913	0.913	0.913	0.916	0.914	0.911
	5	1	1	0.980	0.914	0.898	0.904	0.907	0.913	0.907	0.911	0.910	0.914	0.915
	5	5	0	0.983	0.918	0.906	0.909	0.917	0.919	0.917	0.915	0.917	0.918	0.919
	5	5	0.25	0.982	0.922	0.904	0.910	0.913	0.920	0.914	0.923	0.918	0.920	0.921
	5	5	0.5	0.981	0.922	0.909	0.918	0.921	0.919	0.920	0.920	0.921	0.924	0.921
	5	5	0.75	0.981	0.909	0.901	0.905	0.914	0.913	0.913	0.913	0.916	0.914	0.911
	5	5	1	0.980	0.914	0.898	0.904	0.907	0.913	0.907	0.911	0.910	0.914	0.915
	5	10	0	0.983	0.918	0.906	0.909	0.917	0.919	0.917	0.915	0.917	0.918	0.919
	5	10	0.25	0.982	0.922	0.904	0.910	0.913	0.920	0.914	0.923	0.918	0.920	0.921
	5	10	0.5	0.981	0.922	0.909	0.918	0.921	0.919	0.920	0.920	0.921	0.924	0.921
	5	10	0.75	0.981	0.909	0.901	0.905	0.914	0.913	0.913	0.913	0.916	0.914	0.911
	5	10	1	0.980	0.914	0.898	0.904	0.907	0.913	0.907	0.911	0.910	0.914	0.915
	5	20	0	0.983	0.918	0.906	0.909	0.917	0.919	0.917	0.915	0.917	0.918	0.919
	5	20	0.25	0.982	0.922	0.904	0.910	0.913	0.920	0.914	0.923	0.918	0.920	0.921
0.85	5	20	0.5	0.981	0.922	0.909	0.918	0.921	0.919	0.920	0.920	0.921	0.924	0.921
	5	20	0.75	0.981	0.909	0.901	0.905	0.914	0.913	0.913	0.913	0.916	0.914	0.911
	5	20	1	0.980	0.914	0.898	0.904	0.907	0.913	0.907	0.911	0.910	0.914	0.915
	5	50	0	0.983	0.918	0.906	0.909	0.917	0.919	0.917	0.915	0.917	0.918	0.919
	5	50	0.25	0.982	0.922	0.904	0.910	0.913	0.920	0.914	0.923	0.918	0.920	0.921
	5	50	0.5	0.981	0.922	0.909	0.918	0.921	0.919	0.920	0.920	0.921	0.924	0.921
	5	50	0.75	0.981	0.909	0.901	0.905	0.914	0.913	0.913	0.913	0.916	0.914	0.911
	5	50	1	0.980	0.914	0.898	0.904	0.907	0.913	0.907	0.911	0.910	0.914	0.915
	10	1	0	0.986	0.920	0.904	0.913	0.916	0.919	0.916	0.919	0.922	0.923	0.917
	10	1	0.25	0.981	0.903	0.894	0.902	0.904	0.911	0.905	0.912	0.909	0.910	0.909
	10	1	0.5	0.984	0.915	0.903	0.907	0.909	0.914	0.913	0.913	0.914	0.911	0.911
	10	1	0.75	0.982	0.904	0.900	0.905	0.906	0.906	0.906	0.907	0.908	0.908	0.908
	10	1	1	0.982	0.914	0.898	0.909	0.917	0.911	0.915	0.914	0.920	0.918	0.915
	10	5	0	0.986	0.920	0.904	0.913	0.916	0.919	0.916	0.919	0.922	0.923	0.917
	10	5	0.25	0.981	0.903	0.894	0.902	0.904	0.911	0.905	0.912	0.909	0.910	0.909
	10	5	0.5	0.984	0.915	0.903	0.907	0.909	0.914	0.913	0.913	0.914	0.911	0.911
	10	5	0.75	0.982	0.904	0.900	0.905	0.906	0.906	0.906	0.907	0.908	0.908	0.908
	10	5	1	0.982	0.914	0.898	0.909	0.917	0.911	0.915	0.914	0.920	0.918	0.915

Table 5.9 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.85	10	10	0	0.986	0.920	0.904	0.913	0.916	0.919	0.916	0.919	0.922	0.923	0.917
	10	10	0.25	0.981	0.903	0.894	0.902	0.904	0.911	0.905	0.912	0.909	0.910	0.909
	10	10	0.5	0.984	0.915	0.903	0.907	0.909	0.914	0.913	0.913	0.914	0.911	0.911
	10	10	0.75	0.982	0.904	0.900	0.905	0.906	0.906	0.906	0.907	0.908	0.908	0.908
	10	10	1	0.982	0.914	0.898	0.909	0.917	0.911	0.915	0.914	0.920	0.918	0.915
	10	20	0	0.986	0.920	0.904	0.913	0.916	0.919	0.916	0.919	0.922	0.923	0.917
	10	20	0.25	0.981	0.903	0.894	0.902	0.904	0.911	0.905	0.912	0.909	0.910	0.909
	10	20	0.5	0.984	0.915	0.903	0.907	0.909	0.914	0.913	0.913	0.914	0.911	0.911
	10	20	0.75	0.982	0.904	0.900	0.905	0.906	0.906	0.906	0.907	0.908	0.908	0.908
	10	20	1	0.820	0.914	0.898	0.909	0.917	0.911	0.915	0.914	0.920	0.918	0.915
	10	50	0	0.986	0.920	0.904	0.913	0.916	0.919	0.916	0.919	0.922	0.923	0.917
	10	50	0.25	0.981	0.903	0.894	0.902	0.904	0.911	0.905	0.912	0.909	0.910	0.909
	10	50	0.5	0.984	0.915	0.903	0.907	0.909	0.914	0.913	0.913	0.914	0.911	0.911
	10	50	0.75	0.982	0.904	0.900	0.905	0.906	0.906	0.906	0.907	0.908	0.908	0.908
	10	50	1	0.982	0.914	0.898	0.909	0.917	0.911	0.915	0.914	0.920	0.918	0.915
	20	1	0	0.986	0.916	0.903	0.907	0.908	0.914	0.914	0.920	0.915	0.915	0.918
	20	1	0.25	0.983	0.910	0.894	0.901	0.906	0.910	0.907	0.907	0.910	0.907	0.908
	20	1	0.5	0.982	0.909	0.894	0.903	0.901	0.908	0.905	0.910	0.908	0.905	0.910
	20	1	0.75	0.980	0.905	0.889	0.899	0.901	0.909	0.906	0.907	0.907	0.908	0.911
	20	1	1	0.980	0.910	0.897	0.904	0.906	0.908	0.909	0.911	0.908	0.907	0.911
	20	5	0	0.986	0.916	0.903	0.907	0.908	0.914	0.914	0.920	0.915	0.915	0.918
	20	5	0.25	0.983	0.910	0.894	0.901	0.906	0.910	0.907	0.907	0.910	0.907	0.908
	20	5	0.5	0.982	0.909	0.894	0.903	0.901	0.908	0.905	0.910	0.908	0.905	0.910
	20	5	0.75	0.980	0.905	0.889	0.899	0.901	0.909	0.906	0.907	0.907	0.908	0.911
	20	5	1	0.980	0.910	0.897	0.904	0.906	0.908	0.909	0.911	0.908	0.907	0.911
	20	10	0	0.986	0.916	0.903	0.907	0.908	0.914	0.914	0.920	0.915	0.915	0.918
	20	10	0.25	0.983	0.910	0.894	0.901	0.906	0.910	0.907	0.907	0.910	0.907	0.908
	20	10	0.5	0.982	0.909	0.894	0.903	0.901	0.908	0.905	0.910	0.908	0.905	0.910
	20	10	0.75	0.980	0.905	0.889	0.899	0.901	0.909	0.906	0.907	0.907	0.908	0.911
	20	10	1	0.980	0.910	0.897	0.904	0.906	0.908	0.909	0.911	0.908	0.907	0.911
	20	20	0	0.986	0.916	0.903	0.907	0.908	0.914	0.914	0.920	0.915	0.915	0.918
	20	20	0.25	0.983	0.910	0.894	0.901	0.906	0.910	0.907	0.907	0.910	0.907	0.908
	20	20	0.5	0.982	0.909	0.894	0.903	0.901	0.908	0.905	0.910	0.908	0.905	0.910
	20	20	0.75	0.980	0.905	0.889	0.899	0.901	0.909	0.906	0.907	0.907	0.908	0.911
	20	20	1	0.980	0.910	0.897	0.904	0.906	0.908	0.909	0.911	0.908	0.907	0.911

Table 5.9 (Cont.): Coverage Probabilities of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.85	20	50	0	0.986	0.916	0.903	0.907	0.908	0.914	0.914	0.920	0.915	0.915	0.918
	20	50	0.25	0.983	0.910	0.894	0.901	0.906	0.910	0.907	0.907	0.910	0.907	0.908
	20	50	0.5	0.982	0.909	0.894	0.903	0.901	0.908	0.905	0.910	0.908	0.905	0.910
	20	50	0.75	0.980	0.905	0.889	0.899	0.901	0.909	0.906	0.907	0.907	0.908	0.911
	20	50	1	0.980	0.910	0.897	0.904	0.906	0.908	0.909	0.911	0.908	0.907	0.911
	50	1	0	0.985	0.912	0.896	0.904	0.907	0.912	0.910	0.912	0.910	0.910	0.914
	50	1	0.25	0.987	0.904	0.887	0.896	0.901	0.900	0.901	0.900	0.901	0.904	0.910
	50	1	0.5	0.987	0.906	0.892	0.895	0.898	0.899	0.904	0.903	0.904	0.899	0.905
	50	1	0.75	0.983	0.906	0.894	0.909	0.905	0.911	0.912	0.911	0.908	0.911	0.913
	50	1	1	0.982	0.903	0.890	0.893	0.903	0.901	0.904	0.905	0.901	0.904	0.908
	50	5	0	0.985	0.912	0.896	0.904	0.907	0.912	0.910	0.912	0.910	0.910	0.914
	50	5	0.25	0.987	0.904	0.887	0.896	0.901	0.900	0.901	0.900	0.901	0.904	0.910
	50	5	0.5	0.987	0.906	0.892	0.895	0.898	0.899	0.904	0.903	0.904	0.899	0.905
	50	5	0.75	0.983	0.906	0.894	0.909	0.905	0.911	0.912	0.911	0.908	0.911	0.913
	50	5	1	0.982	0.903	0.890	0.893	0.903	0.901	0.904	0.905	0.901	0.904	0.908
	50	10	0	0.985	0.912	0.896	0.904	0.907	0.912	0.910	0.912	0.910	0.910	0.914
	50	10	0.25	0.987	0.904	0.887	0.896	0.901	0.900	0.901	0.900	0.901	0.904	0.910
	50	10	0.5	0.987	0.906	0.892	0.895	0.898	0.899	0.904	0.903	0.904	0.899	0.905
	50	10	0.75	0.983	0.906	0.894	0.909	0.905	0.911	0.912	0.911	0.908	0.911	0.913
	50	10	1	0.982	0.903	0.890	0.893	0.903	0.901	0.904	0.905	0.901	0.904	0.908
	50	20	0	0.985	0.912	0.896	0.904	0.907	0.912	0.910	0.912	0.910	0.910	0.914
	50	20	0.25	0.987	0.904	0.887	0.896	0.901	0.900	0.901	0.900	0.901	0.904	0.910
	50	20	0.5	0.987	0.906	0.892	0.895	0.898	0.899	0.904	0.903	0.904	0.899	0.905
	50	20	0.75	0.983	0.906	0.894	0.909	0.905	0.911	0.912	0.911	0.908	0.911	0.913
	50	20	1	0.982	0.903	0.890	0.893	0.903	0.901	0.904	0.905	0.901	0.904	0.908
	50	50	0	0.985	0.912	0.896	0.904	0.907	0.912	0.910	0.912	0.910	0.910	0.914
	50	50	0.25	0.987	0.904	0.887	0.896	0.901	0.900	0.901	0.900	0.901	0.904	0.910
	50	50	0.5	0.987	0.906	0.892	0.895	0.898	0.899	0.904	0.903	0.904	0.899	0.905
	50	50	0.75	0.983	0.906	0.894	0.909	0.905	0.911	0.912	0.911	0.908	0.911	0.913
	50	50	1	0.982	0.903	0.890	0.893	0.903	0.901	0.904	0.905	0.901	0.904	0.908

5.2 Average Interval Lengths

For these simulations considered the following values of λ, ν, p and sample size n for parameter estimation:

$n = 10, 50, 100,$

$\lambda = 2, 5, 10, 20, 50,$

$\nu = 1, 5, 10, 50,$

$p = 0, 0.25, 0.5, 0.75, 1.$

We simulate 1,000 samples of sizes $n = 10, 50, 100$ from Crack distribution. For each sample of size n, we calculated 90% confidence interval for the population mean and the actual coverage probability of these 1,000 intervals was computed.

Next, for each sample the dependent bootstrap 90% confidence interval for the population mean was formed by drawing 2,000 dependent bootstrap samples of size n, and replication factors (k copies) $k = 2, 4, 6, 8, 10, 12, 20, 30, 40$. Using the 2,000 dependent bootstrap samples, the Bootstrap-t, Percentile, and Modified Percentile confidence intervals for the population mean were obtained. In addition, the same procedure was followed using the independent bootstrap method.

The numerical results are summarized in Tables 5.10-5.18. When sample size n is large, gives the average interval lengths of independent and dependent bootstrap confidence intervals shortest than sample size n is small.

The average interval lengths of the dependent bootstrap confidence intervals: Bootstrap-t and Percentile, give the shortest than the average interval lengths of independent bootstrap and also close to 90% confidence level.

On the other hand, the average interval lengths of the Modified Percentile independent bootstrap confidence interval give the shortest average interval lengths compare to the dependent bootstrap and considered at 90% confidence level.

For example, in Tables 5.12, and 5.15, when $n = 100$, $k = 40$, $\lambda = 10$, $\nu = 20$, and $p = 0.75$, the dependent Bootstrap-t, and Percentile confidence interval methods give the average interval lengths is 14.8774, and 14.917, respectively, while the independent bootstrap give the average interval lengths is 15.25931, and 15.09832, respectively.

From Table 5.18, when $n = 100$, $k = 40$, $\lambda = 10$, $\nu = 10$, and $p = 0.5$, the average interval lengths of independent bootstrap confidence interval is 10.89259, while the average interval lengths of dependent bootstrap confidence interval is 10.9215.

Table 5.10: Average interval length of mean for Crack distribution n = 10

(Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
2	1	0	2.0136	1.6493	0.8311	1.2426	1.3783	1.4446	1.4873	1.5146	1.5659	1.5987	1.6119
2	1	0.25	1.9360	1.6061	0.8090	1.2092	1.3423	1.4070	1.4484	1.4741	1.5248	1.5553	1.5684
2	1	0.5	1.8065	1.5150	0.7618	1.1410	1.2644	1.3267	1.3666	1.3888	1.4378	1.4651	1.4783
2	1	0.75	1.6385	1.3875	0.6949	1.0433	1.1569	1.2132	1.2493	1.2703	1.3161	1.3425	1.3530
2	1	1	1.4019	1.1845	0.5960	0.8925	0.9897	1.0389	1.0691	1.0881	1.1257	1.1473	1.1559
2	5	0	10.0677	8.2467	4.1556	6.2130	6.8913	7.2229	7.4363	7.5731	7.8293	7.9935	8.0597
2	5	0.25	9.6798	8.0305	4.0451	6.0462	6.7113	7.0352	7.2419	7.3704	7.6241	7.7765	7.8422
2	5	0.5	9.0325	7.5749	3.8088	5.7051	6.3218	6.6335	6.8332	6.9441	7.1891	7.3253	7.3915
2	5	0.75	8.1925	6.9372	3.4745	5.2163	5.7844	6.0662	6.2465	6.3516	6.5804	6.7123	6.7651
2	5	1	7.0097	5.9225	2.9799	4.4623	4.9485	5.1944	5.3453	5.4404	5.6285	5.7365	5.7794
2	10	0	20.1355	16.4933	8.3111	12.4260	13.7826	14.4458	14.8726	15.1452	15.6586	15.9869	16.1194
2	10	0.25	19.3595	16.0610	8.0901	12.0923	13.4227	14.0703	14.4838	14.7408	15.2482	15.5530	15.6844
2	10	0.5	18.0650	15.1498	7.6177	11.4102	12.6435	13.2669	13.6663	13.8881	14.3782	14.6505	14.7830
2	10	0.75	16.3851	13.8745	6.9489	10.4325	11.5688	12.1323	12.4929	12.7031	13.1607	13.4245	13.5302
2	10	1	14.0193	11.8451	5.9599	8.9245	9.8969	10.3887	10.6907	10.8809	11.2570	11.4729	11.5587
2	20	0	40.2709	32.9866	16.6223	24.8521	27.5652	28.8916	29.7453	30.2923	31.3172	31.9738	32.2388
2	20	0.25	38.7191	32.1220	16.1803	24.1846	26.8453	28.1406	28.9675	29.4815	30.4965	31.1059	31.3689
2	20	0.5	36.1300	30.2996	15.2354	22.8204	25.2871	26.5338	27.3327	27.7762	28.7564	29.3010	29.5661
2	20	0.75	32.7702	27.7489	13.8979	20.8650	23.1375	24.2647	24.9858	25.4063	26.3214	26.8491	27.0603
2	20	1	28.0387	23.6902	11.9198	17.8491	19.7938	20.7774	21.3814	21.7618	22.5140	22.9459	23.1174
2	50	0	100.6773	82.4665	41.5557	62.1301	68.9131	72.2290	74.3632	75.7309	78.2929	79.9345	80.5971
2	50	0.25	96.7977	80.3051	40.4507	60.4616	67.1133	70.3515	72.4188	73.7038	76.2411	77.7647	78.4222
2	50	0.5	90.3250	75.7490	38.0884	57.0509	63.2177	66.3346	68.3316	69.4405	71.8910	73.2525	73.9151
2	50	0.75	81.9254	69.3722	34.7446	52.1625	57.8437	60.6617	62.4646	63.5156	65.8036	67.1227	67.6508
2	50	1	70.0966	59.2254	29.7994	44.6227	49.4846	51.9436	53.4534	54.4044	56.2850	57.3647	57.7935
5	1	0	2.6804	2.1015	1.0649	1.5857	1.7605	1.8456	1.8956	1.9309	1.9995	2.0369	2.0527
5	1	0.25	2.6220	2.0624	1.0442	1.5551	1.7270	1.8105	1.8602	1.8941	1.9592	1.9975	2.0143
5	1	0.5	2.5231	1.9892	1.0070	1.5004	1.6641	1.7461	1.7955	1.8249	1.8900	1.9256	1.9424
5	1	0.75	2.4014	1.8943	0.9562	1.4285	1.5824	1.6594	1.7088	1.7361	1.7986	1.8330	1.8481
5	1	1	2.2443	1.7656	0.8935	1.3335	1.4783	1.5520	1.5949	1.6215	1.6792	1.7104	1.7238

Table 5.10(Cont.): Average interval length of mean for Crack distribution n = 10 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
5	5	0	13.4022	10.5077	5.3245	7.9286	8.8023	9.2279	9.4782	9.6543	9.9973	10.1843	10.2636
5	5	0.25	13.1098	10.3121	5.2209	7.7753	8.6350	9.0526	9.3009	9.4705	9.7959	9.9876	10.0716
5	5	0.5	12.6154	9.9460	5.0350	7.5019	8.3205	8.7303	8.9775	9.1244	9.4496	9.6278	9.7120
5	5	0.75	12.0069	9.4712	4.7808	7.1424	7.9118	8.2971	8.5440	8.6804	8.9929	9.1649	9.2403
5	5	1	11.2217	8.8280	4.4674	6.6675	7.3914	7.7599	7.9745	8.1073	8.3962	8.5520	8.6188
5	10	0	26.8044	21.0154	10.6491	15.8572	17.6046	18.4558	18.6564	19.3087	19.9947	20.3686	20.5273
5	10	0.25	26.2195	20.6242	10.4417	15.5505	17.2701	18.1053	18.6018	18.9411	19.5918	19.9751	20.1432
5	10	0.5	25.2308	19.8921	10.0700	15.0038	16.6410	17.4606	17.9551	18.2488	18.8992	19.2557	19.4240
5	10	0.75	24.0138	18.9425	9.5616	14.2848	15.8236	16.5943	17.0881	17.3609	17.9858	18.3299	18.4806
5	10	1	22.4434	17.6561	8.9349	13.3349	14.7827	15.5197	15.9491	16.2145	16.7924	17.1040	17.2376
5	20	0	53.6089	42.0308	21.2982	31.7144	35.2092	36.9116	37.9129	38.6173	39.9893	40.7372	41.0546
5	20	0.25	52.4390	41.2485	20.8835	31.1010	34.5401	36.2106	37.2035	37.8821	39.1836	39.9503	40.2863
5	20	0.5	50.4616	39.7841	20.1400	30.0076	33.2820	34.9211	35.9102	36.4975	37.7985	8.5114	38.8479
5	20	0.75	48.0277	37.8850	19.1231	28.5696	31.6472	33.1885	34.1761	34.7217	35.9717	36.6598	36.9611
5	20	1	44.8869	35.3122	17.8697	26.6699	29.5654	31.0394	31.8981	32.4290	33.5848	34.2079	34.4753
5	50	0	134.0221	105.0770	53.2454	79.2860	88.0229	92.2789	94.7822	96.5433	99.9733	101.8430	102.6364
5	50	0.25	131.0975	103.1212	52.2086	77.7525	86.3504	90.5264	93.0088	94.7053	97.9591	99.8757	100.7158
5	50	0.5	126.1539	99.4604	50.3501	75.0189	83.2051	87.3028	89.7755	91.2438	94.4961	96.2784	97.1198
5	50	0.75	120.0692	94.7124	47.8078	71.4241	79.1180	82.9712	85.4404	86.8043	89.9291	91.6494	92.4028
5	50	1	112.2171	88.2804	44.6743	66.6747	73.9135	77.5985	79.7453	81.0726	83.9619	85.5198	86.1882
10	1	0	3.5211	2.7002	1.3704	2.0420	2.2633	2.3754	2.4395	2.4823	2.5721	2.6201	2.6384
10	1	0.25	3.4749	2.6671	1.3540	2.0155	2.2353	2.3452	2.4091	2.4517	2.5393	2.5855	2.6036
10	1	0.5	3.4007	2.6127	1.3257	1.9736	2.1864	2.2951	2.3599	2.3995	2.4857	2.5316	2.5491
10	1	0.75	3.3089	2.5400	1.2878	1.9176	2.1270	2.2315	2.2942	2.3329	2.4167	2.4620	2.4805
10	1	1	3.1954	2.4476	1.2439	1.8520	2.0546	2.1548	2.2142	2.2514	2.3322	2.3754	2.3914
10	5	0	17.6055	13.5010	6.8519	10.2100	11.3162	11.8770	12.1976	12.4117	12.8603	13.1004	13.1919
10	5	0.25	17.3744	13.3356	6.7702	10.0775	11.1765	11.7259	12.0453	12.2586	12.6964	12.9277	13.0180
10	5	0.5	17.0033	13.0636	6.6284	9.8681	10.9318	11.4754	11.7994	11.9976	12.4286	12.6578	12.7455
10	5	0.75	16.5443	12.6998	6.4388	9.5878	10.6352	11.1572	11.4709	11.6645	12.0836	12.3099	12.4025
10	5	1	15.9769	12.2382	6.2192	9.2599	10.2730	10.7742	11.0710	11.2572	11.6608	11.8767	11.9570
10	10	0	35.2110	27.0019	13.7038	20.4199	22.6325	23.7540	24.3953	24.8234	25.7206	26.2009	26.3838
10	10	0.25	34.7488	26.6711	13.5403	20.1550	22.3530	23.4518	24.0906	24.5173	25.3928	25.8554	26.0359
10	10	0.5	34.0067	26.1271	13.2568	19.7361	21.8637	22.9507	23.5988	23.9951	24.8572	25.3156	25.4909
10	10	0.75	33.0885	25.3997	12.8776	19.1756	21.2704	22.3145	22.9419	23.3291	24.1671	24.6199	24.8049
10	10	1	31.9537	24.4764	12.4385	18.5199	20.5460	21.5483	22.1421	22.5144	23.3215	23.7535	23.9139

Table 5.10(Cont.): Average interval length of mean for Crack distribution n = 10 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
10	20	0	70.4220	54.0038	27.4077	40.8399	45.2649	47.5080	48.7906	49.6468	51.4412	52.4017	52.7676
10	20	0.25	69.4976	53.3422	27.0806	40.3100	44.7060	46.9035	48.1813	49.0346	50.7856	51.7107	52.0719
10	20	0.5	68.0134	52.2542	26.5137	39.4722	43.7273	45.9014	47.1976	47.9902	49.7144	50.6312	50.9819
10	20	0.75	66.1770	50.7994	25.7552	38.3512	42.5408	44.6290	45.8838	46.6582	48.3343	49.2398	49.6098
10	20	1	63.9074	48.9528	24.8769	37.0397	41.0920	43.0966	44.2842	45.0288	46.6430	47.5069	47.8279
10	50	0	176.0550	135.0096	68.5192	102.0996	113.1623	118.7700	121.9765	124.1170	128.6031	131.0043	131.9189
10	50	0.25	173.7440	133.3556	67.7016	100.7750	111.7649	117.2588	120.4532	122.8594	126.9639	129.2768	130.1796
10	50	0.5	170.0334	130.6355	66.2842	98.6805	109.3182	114.7535	117.9939	119.9756	124.2859	126.5781	127.4547
10	50	0.75	165.4425	126.9984	64.3880	65.8779	106.3520	111.5724	114.7094	116.6454	120.8356	123.0994	124.0245
10	50	1	159.7685	122.3821	62.1923	92.5994	102.7301	107.7415	110.7104	112.5721	116.6075	118.7674	119.5697
20	1	0	4.7819	3.6240	1.8437	2.7425	3.0385	3.1863	3.2742	3.3333	3.4494	3.5148	3.5403
20	1	0.25	4.7448	3.5944	18.2987	2.7204	3.0163	3.1633	3.2499	3.3065	3.4245	3.4867	3.5120
20	1	0.5	4.6879	3.5562	1.8084	2.6876	2.9782	3.1244	3.2136	3.2673	3.3821	3.4450	3.4717
20	1	0.75	4.6222	3.5028	1.7812	2.6490	2.9360	3.0795	3.1649	3.2192	3.3339	3.3946	3.4221
20	1	1	4.5413	3.4392	1.7501	2.6026	2.8851	3.0262	3.1096	3.1626	3.2741	3.3345	3.3612
20	5	0	23.9094	18.1198	9.2183	13.7127	15.1923	15.9316	16.3711	16.6662	17.2472	17.5741	17.7017
20	5	0.25	23.7240	17.9721	9.1494	13.6020	15.0816	15.8167	16.2493	16.5327	17.1225	17.4334	17.5598
20	5	0.5	23.4397	17.7810	9.0420	13.4381	14.8911	15.6221	16.0678	16.3366	16.9107	17.2251	17.3587
20	5	0.75	23.1111	17.5142	8.9061	13.2450	14.6798	15.3976	15.8246	16.0960	16.6693	16.9730	17.1106
20	5	1	22.7063	17.1962	8.7507	13.0131	14.4253	15.1311	15.5478	15.8131	16.3703	16.6723	16.8060
20	10	0	47.8187	36.2397	18.4366	27.4255	30.3845	31.8633	32.7422	33.3325	34.4943	35.1481	35.4034
20	10	0.25	47.4480	35.9442	18.2987	27.2039	30.1632	31.6334	32.4986	33.0654	34.2449	34.8668	35.1196
20	10	0.5	46.8794	35.5619	18.0840	26.8761	29.7822	31.2441	32.1356	32.6732	33.8213	34.4503	34.7174
20	10	0.75	46.2223	35.0284	17.8122	26.4899	29.3597	30.7951	31.6493	32.1921	33.3385	33.9460	34.2212
20	10	1	45.4126	34.3923	17.5013	26.0262	28.8505	30.2622	31.0956	31.6261	32.7407	33.3446	33.6120
20	20	0	95.6375	72.4793	36.8732	54.8509	60.7690	63.7266	65.4843	66.6649	68.9886	70.2963	70.8068
20	20	0.25	94.8960	71.8884	36.5974	54.4078	60.3264	63.2669	64.9972	66.1307	68.4898	69.7335	70.2391
20	20	0.5	93.7589	71.1238	36.1680	53.7522	59.5644	62.4883	64.2713	65.3464	67.6426	68.9006	69.4348
20	20	0.75	92.4446	70.0567	35.6243	52.9798	58.7194	61.5903	63.2985	64.3842	66.6771	67.8920	68.4423
20	20	1	90.8252	68.7847	35.0027	52.0525	57.7010	60.5243	62.1913	63.2522	65.4814	66.6892	67.2239

Table 5.10(Cont.): Average interval length of mean for Crack distribution n = 10 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
20	50	0	239.0936	181.1983	92.1830	137.1272	151.9225	159.3164	163.7108	166.6623	172.4715	175.7407	177.0170
20	50	0.25	237.2399	179.7210	91.4935	136.0196	150.8159	158.1672	162.4931	165.3268	171.2245	174.3338	175.5977
20	50	0.5	234.3972	177.8095	90.4201	134.3806	148.9111	156.2207	160.6782	163.3659	169.1066	172.2514	173.5870
20	50	0.75	231.1114	175.1418	89.0609	132.4495	146.7984	153.9756	158.2463	160.9605	166.6927	169.7299	171.1058
20	50	1	227.0630	171.9617	87.5066	130.1312	144.2525	151.3109	155.4782	158.1305	163.7034	166.7231	168.0598
50	1	0	7.3554	5.5307	2.8181	4.1851	4.6408	4.8645	4.9984	5.0820	5.2681	5.3601	5.4043
50	1	0.25	7.3283	5.5099	2.8072	4.1700	4.6247	4.8473	4.9807	5.0633	5.2480	5.3377	5.3827
50	1	0.5	7.2900	5.4818	2.7924	4.1496	4.5978	4.8210	4.9551	5.0378	5.2201	5.3135	5.3578
50	1	0.75	7.2476	5.4508	2.7746	4.1238	4.5714	4.7931	4.9232	5.0077	5.1906	5.2812	5.3263
50	1	1	7.1964	5.4104	2.7561	4.0955	4.5415	4.7616	4.8911	4.9712	5.1506	5.2426	5.2865
50	5	0	36.7771	27.6535	14.0907	20.9257	23.2038	24.3227	24.9920	25.4101	26.3403	26.8003	27.0216
50	5	0.25	36.6415	27.5495	14.0360	20.8502	23.1234	24.2364	24.9032	25.3167	26.2440	26.6886	26.9134
50	5	0.5	36.4500	27.4092	13.6919	20.7478	22.9888	24.1052	24.7753	25.1892	26.1005	26.5673	26.7891
50	5	0.75	36.2382	27.2541	13.8729	20.6189	22.8570	23.9656	24.6162	25.0386	25.9529	26.4059	26.6315
50	5	1	35.9818	27.0518	13.7805	20.4775	22.7073	23.8082	24.4556	24.8558	25.7527	26.2129	26.4327
50	10	0	73.5542	55.3070	28.1814	41.8514	46.4077	48.6454	49.9841	50.8201	52.6807	53.6006	54.0431
50	10	0.25	73.2829	55.0990	28.0721	41.7004	46.2468	48.4728	49.8065	50.6333	52.4801	53.3772	53.8267
50	10	0.5	72.8999	54.8184	27.9239	41.4956	45.9776	48.2103	49.5506	50.3784	52.2009	53.1347	53.5783
50	10	0.75	72.4764	54.5082	27.7458	41.2378	45.7140	47.9313	49.2325	50.0772	51.9058	52.8119	53.2629
50	10	1	71.9636	54.1035	27.5610	40.9550	45.4146	47.6164	48.9112	49.7115	51.5055	52.4258	52.8654
50	20	0	147.1083	110.6141	56.3627	83.7027	92.8153	97.2909	99.9681	101.6403	105.3614	107.2012	108.0863
50	20	0.25	146.5658	110.1979	56.1442	83.4007	92.4936	96.9456	99.6129	101.2666	104.9602	106.7544	107.6534
50	20	0.5	145.7998	109.6367	55.8478	82.9911	91.9552	96.4206	99.1011	100.7567	104.4019	106.1693	107.1565
50	20	0.75	144.9527	109.0164	55.4915	82.4756	91.4280	95.8625	98.4649	100.1543	103.8116	105.6238	106.5258
50	20	1	143.9272	108.2071	55.1221	81.9099	90.8292	95.2328	97.8224	99.4230	103.0110	104.8516	105.7307
50	50	0	367.7707	276.5352	140.9068	209.2567	232.0384	243.2272	249.9202	254.1006	263.4034	268.0030	270.2157
50	50	0.25	366.4145	275.4948	140.3604	208.5017	231.2339	242.3639	249.0323	253.1665	262.4004	266.8859	269.1336
50	50	0.5	364.4995	274.0918	139.6194	207.4778	229.8881	241.0515	247.7527	251.8917	261.0047	265.6733	267.8912
50	50	0.75	362.3819	272.5409	138.7288	206.1889	228.5701	239.6563	246.1622	250.3858	259.5290	264.0594	266.3145
50	50	1	359.8179	270.5177	137.8051	204.7748	227.0729	238.0820	244.5559	248.5576	257.5274	262.1290	264.3268

Table 5.11: Average interval length of mean for Crack distribution n = 50

(Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
2	1	0	0.9228	0.6710	0.3369	0.5045	0.5602	0.5877	0.6046	0.6151	0.6380	0.6482	0.6547
2	1	0.25	0.8854	0.6453	0.3239	0.4849	0.5389	0.5654	0.5811	0.5913	0.6136	0.6236	0.6294
2	1	0.5	0.8288	0.6060	0.3038	0.4544	0.5057	0.5301	0.5456	0.5553	0.5758	0.5854	0.5907
2	1	0.75	0.7504	0.5493	0.2760	0.4125	0.4587	0.4814	0.4955	0.5040	0.5227	0.5318	0.5363
2	1	1	0.6494	0.4764	0.2395	0.3583	0.3978	0.4174	0.4295	0.4376	0.4533	0.4610	0.4652
2	5	0	4.6142	3.3550	1.6847	2.5224	2.8009	2.9387	3.0230	3.0756	3.1899	3.2412	3.2733
2	5	0.25	4.4271	3.2267	1.6195	2.4246	2.6943	2.8270	2.9053	2.9567	3.0678	3.1179	3.1467
2	5	0.5	4.1440	3.0298	1.5192	2.2722	2.5286	2.6505	2.7280	2.7765	2.8787	2.9267	2.9533
2	5	0.75	3.7520	2.7465	1.3798	2.0627	2.2934	2.4068	2.4774	2.5202	2.6136	2.6592	2.6816
2	5	1	3.2472	2.3820	1.1976	1.7916	1.9892	2.0869	2.1474	2.1882	2.2664	2.3049	2.3259
2	10	0	9.2284	6.7101	3.3694	5.0447	5.6018	5.8774	6.0461	6.1511	6.3798	6.4824	6.5465
2	10	0.25	8.8541	6.4534	3.2391	4.8492	5.3886	5.6540	5.8105	5.9134	6.1355	6.2358	6.2935
2	10	0.5	8.2879	6.0596	3.0383	4.5444	5.0572	5.3010	5.4560	5.5530	5.7575	5.8535	5.9065
2	10	0.75	7.5040	5.4930	2.7596	4.1254	4.5867	4.8136	4.9548	5.0403	5.2271	5.3184	5.3633
2	10	1	6.4944	4.7641	2.3952	3.5831	3.9784	4.1738	4.2948	4.3763	4.5329	4.6098	4.6518
2	20	0	18.4569	1.4202	6.7387	10.0895	11.2036	11.7548	12.0921	12.3023	12.7596	12.9647	13.0930
2	20	0.25	17.7083	12.9068	6.4781	9.6984	10.7772	11.3079	11.6211	11.8269	12.2711	12.4716	12.5869
2	20	0.5	16.5759	12.1193	6.0766	9.0887	10.1143	10.6020	10.9120	11.1061	11.5150	11.7069	11.8130
2	20	0.75	15.0080	10.9860	5.5192	8.2508	9.1734	9.6272	9.9095	10.0807	10.4542	10.6369	10.7266
2	20	1	12.9888	9.5281	4.7904	7.1662	7.9567	8.3476	8.5897	8.7526	9.0658	9.2195	9.3035
2	50	0	46.1421	33.5504	16.8468	25.2236	28.0090	29.3869	30.2303	30.7557	31.8991	32.4119	32.7326
2	50	0.25	44.2706	32.2670	16.1953	24.2460	26.9429	28.2698	29.0527	29.5672	30.6777	31.1790	31.4673
2	50	0.5	41.4397	30.2981	15.1915	22.7218	25.2858	26.5049	27.2800	27.7652	28.7874	29.2673	29.5325
2	50	0.75	37.5201	27.4651	13.7980	20.6270	22.9335	24.0680	24.7738	25.2017	26.1356	26.5921	26.8165
2	50	1	32.4720	23.8204	11.9760	17.9155	19.8918	20.8691	21.4742	21.8815	22.6644	23.0487	23.2588
5	1	0	1.2228	0.8805	0.4428	0.6616	0.7354	0.7716	0.7930	0.8079	0.8376	0.8513	0.8586
5	1	0.25	1.1956	0.8613	0.4332	0.6471	0.7190	0.7552	0.7763	0.7901	0.8193	0.8330	0.8402
5	1	0.5	1.1546	0.8320	0.4186	0.6249	0.6950	0.7290	0.7499	0.7635	0.7916	0.8050	0.8118
5	1	0.75	1.0997	0.7934	0.3991	0.5956	0.6621	0.6950	0.7147	0.7276	0.7536	0.7672	0.7740
5	1	1	1.0331	0.7458	0.3750	0.5602	0.6221	0.6530	0.6711	0.6844	0.7086	0.7204	0.7273

Table 5.11(Cont.): Average interval length of mean for Crack distribution n = 50 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
5	5	0	6.1141	4.4026	2.2139	3.3081	3.6770	3.8578	3.9651	4.0394	4.1878	4.2567	4.2932
5	5	0.25	5.9781	4.3063	2.1658	3.2356	3.5949	3.7762	3.8813	3.9506	4.0966	4.1651	4.2012
5	5	0.5	5.7730	4.1602	2.0927	3.1247	3.4748	3.6451	3.7494	3.8173	3.9582	4.0248	4.0589
5	5	0.75	5.4985	3.9671	1.9952	2.9778	3.3103	3.4749	3.5735	3.6381	3.7678	3.8359	3.8700
5	5	1	5.1657	3.7289	1.8750	2.8011	3.1107	3.2651	3.3556	3.4219	3.5428	3.6020	3.6364
5	10	0	12.2282	8.8053	4.4278	6.6161	7.3540	7.7157	7.9301	8.0788	8.3756	8.5134	8.8563
5	10	0.25	11.9562	8.6127	4.3316	6.4711	7.1898	7.5523	7.7625	7.9013	8.1933	8.3302	8.4024
5	10	0.5	11.5460	8.3204	4.1855	6.2494	6.9495	7.2902	7.4987	7.6346	7.9164	8.0496	8.1177
5	10	0.75	10.9970	7.9343	3.9905	5.9555	6.6206	6.9497	7.1471	7.2762	7.5355	7.6717	7.7399
5	10	1	10.3314	7.4578	3.7500	5.6023	6.2215	6.5303	6.7112	6.8439	7.0856	7.2041	7.2728
5	20	0	24.4565	17.6105	8.8556	13.2323	14.7081	15.4314	15.8602	16.1575	16.7512	17.0269	17.1726
5	20	0.25	23.9123	17.2253	8.6631	12.9423	14.3796	15.1047	15.5250	15.8025	16.3866	16.6605	16.8048
5	20	0.5	23.0920	16.6409	8.3710	12.4987	13.8990	14.5804	14.9975	15.2692	15.8327	16.0992	16.2355
5	20	0.75	21.9940	15.8685	7.9810	11.9111	13.2412	13.8994	14.2942	14.5524	15.0711	15.3435	15.4798
5	20	1	20.6629	14.9156	7.4999	11.2046	12.4429	13.0606	13.4224	13.6877	14.1711	14.4081	14.5455
5	50	0	61.1411	44.0264	22.1389	33.0807	36.7701	38.5784	39.6506	40.3938	41.8780	42.5672	42.9315
5	50	0.25	59.7808	43.0634	21.6577	32.3557	35.9491	37.7616	38.8125	39.5063	40.9665	41.6511	42.0121
5	50	0.5	57.7299	41.6022	20.9274	31.2468	34.7475	36.4510	37.4937	38.1729	39.5818	40.2481	40.5886
5	50	0.75	54.9849	39.6713	19.9524	29.7777	33.1029	34.7485	35.7354	36.3810	37.6776	38.3587	38.6995
5	50	1	51.6572	37.2889	18.7498	28.0114	31.1072	32.6514	33.5559	34.2194	35.4278	36.0202	36.3638
10	1	0	1.6033	1.1486	0.5776	0.8634	0.9596	1.0071	1.0348	1.0543	1.0926	1.1110	1.1214
10	1	0.25	1.5827	1.1338	0.5702	0.8524	0.9477	0.9943	1.0223	1.0410	1.0789	1.0973	1.1069
10	1	0.5	1.5515	1.1123	0.5592	0.8356	0.9291	0.9751	1.0024	1.0209	1.0575	1.0753	1.0846
10	1	0.75	1.5116	1.0833	0.5451	0.8143	0.9050	0.9499	0.9764	0.9949	1.0297	1.0480	1.0577
10	1	1	1.4652	1..05106	0.5285	0.7895	0.8777	0.9204	0.9465	0.9649	0.9983	1.0157	1.0249
10	5	0	8.0162	5.7429	2.8879	4.3172	4.7978	5.0355	5.1741	5.2713	5.4627	5.5549	5.6071
10	5	0.25	7.9135	5.6692	2.8507	4.2619	4.7384	4.9715	5.1113	5.2052	5.3945	5.4866	5.5344
10	5	0.5	7.7575	5.5614	2.7959	4.1781	4.6455	4.8756	5.0120	5.1044	5.2875	5.3767	5.4230
10	5	0.75	7.5578	5.4163	2.7255	4.0713	4.5247	4.7497	4.8821	4.9744	5.1484	5.2397	5.2886
10	5	1	7.3260	5.2553	2.6424	3.9476	4.3885	4.6020	4.7324	4.8243	4.9916	5.0783	5.1246
10	10	0	16.0325	11.4859	5.7757	8.6343	9.5956	10.0709	10.3483	10.5426	10.9255	11.1098	11.2141
10	10	0.25	15.8269	11.3384	5.7015	8.5238	9.4769	9.9429	10.2226	10.4104	10.7890	10.9733	11.0687
10	10	0.5	15.5151	11.1227	5.5917	8.3562	9.2909	9.7513	10.0240	10.2089	10.5750	10.7533	10.8460
10	10	0.75	15.1157	10.8326	5.4509	8.1427	9.0495	9.4993	9.7642	9.9488	10.2968	10.4795	10.5771
10	10	1	14.6519	10.5106	5.2847	7.8953	8.7769	9.2039	9.4647	9.6486	9.9831	10.1567	10.2493

Table 5.11(Cont.): Average interval length of mean for Crack distribution n = 50 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
10	20	0	32.0650	22.9718	11.5514	17.2686	19.1912	20.1418	20.6965	21.0852	21.8509	22.2197	22.4282
10	20	0.25	31.6539	22.6769	11.4030	17.0476	18.9537	19.8858	20.4453	20.8207	21.5780	21.9466	22.1374
10	20	0.5	31.0301	22.2454	11.1835	16.7123	18.5818	19.5025	20.0480	20.4177	21.1501	21.5067	21.6921
10	20	0.75	30.2313	21.6651	10.9018	16.2854	18.0989	18.9987	19.5284	19.8977	20.5936	20.9590	21.1543
10	20	1	29.3039	21.0213	10.5694	15.7906	17.5538	18.4078	18.9295	19.2973	19.9662	20.3134	20.4985
10	50	0	80.1624	57.4294	28.8785	43.1716	47.9779	50.3546	51.7413	52.7129	54.6273	55.5492	56.0706
10	50	0.25	79.1347	56.6921	28.5074	42.6190	47.3843	49.7146	51.1132	52.0518	53.9449	54.8665	55.3435
10	50	0.5	77.5753	55.6135	27.9587	41.7808	46.4546	48.7564	50.1199	51.0443	52.8752	53.7667	54.2302
10	50	0.75	75.5783	54.1627	27.2546	40.7134	45.2473	47.4967	48.8211	49.7442	51.4839	52.3974	52.8856
10	50	1	73.2597	52.5532	26.4236	39.4764	43.8846	46.0195	47.3237	48.2432	49.9155	50.7834	51.2462
20	1	0	2.1738	1.5542	0.7812	1.1672	1.2968	1.3618	1.3999	1.4264	1.4775	1.5027	1.5169
20	1	0.25	2.1591	1.5428	0.7762	1.1592	1.2875	1.3529	1.3899	1.4167	1.4677	1.4922	1.5063
20	1	0.5	2.1367	1.5280	0.7683	1.1478	1.2752	1.3394	1.3753	1.4016	1.4526	1.4773	1.4896
20	1	0.75	2.1069	1.5068	0.7575	1.1316	1.2578	1.3202	1.3565	1.3830	1.4316	1.4564	1.4689
20	1	1	2.0745	1.4847	0.7456	1.1363	1.2387	1.3005	1.3358	1.3614	1.4095	1.4341	1.4461
20	5	0	10.8692	7.7707	3.9062	5.8361	6.4839	6.8090	6.9996	7.1320	7.3877	7.5137	7.5843
20	5	0.25	10.7957	7.7139	3.8811	5.7962	6.4374	6.7645	6.9497	7.0833	7.3384	7.4610	7.5316
20	5	0.5	10.6833	7.6402	3.8414	5.7388	6.3762	6.6967	6.8765	7.0078	7.2629	7.3863	7.4482
20	5	0.75	10.5347	7.5342	7.8728	5.6579	6.2892	6.6012	6.7824	6.9149	7.1581	7.2818	7.3445
20	5	1	10.3726	7.4236	3.7281	5.5682	6.1933	6.5025	6.6788	6.8070	7.0473	7.1706	7.2304
20	10	0	21.7384	15.5415	7.8123	11.6723	12.9677	13.6180	13.9993	14.2640	14.7754	15.0275	15.1685
20	10	0.25	21.5914	15.4278	7.7622	11.5924	12.8749	13.5290	13.8993	14.1667	14.6767	14.9220	15.0632
20	10	0.5	21.3665	15.2803	7.6827	11.4776	12.7524	13.3935	13.7531	14.0157	14.5258	14.7727	14.8964
20	10	0.75	21.0695	15.0684	7.5746	11.3157	12.5783	13.2024	13.5647	13.8298	14.3161	14.5636	14.6890
20	10	1	20.7453	14.8471	7.4562	11.1363	12.3865	13.0050	13.3577	13.6139	14.0946	14.3411	14.4607
20	20	0	43.4768	31.0829	15.6246	23.3446	25.9354	27.2360	27.9985	28.5281	29.5507	30.0549	30.3371
20	20	0.25	43.1828	30.8557	15.5245	23.1847	25.7497	27.0580	27.7986	28.3333	29.3535	29.8439	30.1264
20	20	0.5	42.7330	30.5606	15.3655	22.9551	25.5048	26.7869	27.5061	28.0313	29.0516	29.5454	29.7928
20	20	0.75	42.1389	30.1368	15.1491	22.6315	25.1567	26.4048	27.1294	27.6595	28.6323	29.1272	29.3779
20	20	1	41.4905	29.6942	14.9125	22.2726	24.7731	26.0100	26.7154	27.2279	28.1892	28.6822	28.9215

Table 5.11(Cont.): Average interval length of mean for Crack distribution n = 50 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
20	50	0	108.6921	77.7073	39.0616	58.3614	64.8386	68.0900	69.9963	71.3202	73.8768	75.1372	75.8426
20	50	0.25	107.9570	77.1391	38.8112	57.9617	64.3743	67.6450	69.4965	70.8333	73.3837	74.6098	75.3159
20	50	0.5	106.8326	76.4016	38.4137	57.3878	63.7619	66.9673	68.7653	70.0783	72.6291	73.8634	74.4821
20	50	0.75	105.3472	75.3419	37.8728	56.5787	62.8917	66.0120	67.8236	69.1488	71.5806	72.8180	73.4448
20	50	1	103.7263	74.2355	37.2811	55.6815	61.9327	65.0250	66.7885	68.0697	70.4729	71.7056	72.3036
50	1	0	3.3452	2.3877	1.1999	1.7931	1.9932	2.0926	2.1498	2.1914	2.2695	2.3097	2.3279
50	1	0.25	3.3362	2.3813	1.1964	1.7883	1.9870	2.0875	2.1436	2.1851	2.2643	2.3023	2.3213
50	1	0.5	3.3213	2.3703	1.1913	1.7808	1.9783	2.0782	2.1334	2.1759	2.2524	2.2931	2.3109
50	1	0.75	3.3019	2.3567	1.1847	1.7698	1.9678	2.0660	2.1210	2.1633	2.2386	2.2803	2.2974
50	1	1	3.2817	2.3435	1.1775	1.7588	1.9551	2.0535	2.1082	2.1499	2.2258	2.2655	2.2840
50	5	0	16.7261	11.9385	5.9995	8.9654	9.9662	10.4631	10.7492	10.9568	11.3474	11.5483	11.6396
50	5	0.25	16.6808	11.9063	5.9819	8.9414	9.9351	10.4376	10.7179	10.9255	11.3217	11.5114	11.6062
50	5	0.5	16.6067	11.8515	5.9565	8.9041	9.8914	10.3912	10.6671	10.8793	11.2621	11.4657	11.5543
50	5	0.75	16.5092	11.7833	5.9233	8.8489	9.8392	10.3301	10.6050	10.8163	11.1929	11.4013	11.4867
50	5	1	16.4085	11.7173	5.8874	8.7938	9.7755	10.2674	10.5408	10.7493	11.1291	11.3275	11.4198
50	10	0	33.4522	23.8769	11.9989	17.9307	19.9323	20.9262	21.4984	21.9137	22.6948	23.0966	23.2792
50	10	0.25	33.3615	23.8126	11.9638	17.8828	19.8702	20.8752	21.4358	21.8511	22.6433	23.0228	23.2125
50	10	0.5	33.2134	23.7030	11.9129	17.8082	19.7827	20.7823	21.3342	21.7585	22.5242	22.9314	23.1085
50	10	0.75	33.0185	23.5665	11.8466	17.6978	17.6784	20.6602	21.2101	21.6325	22.3857	22.8027	22.9735
50	10	1	32.8171	23.4345	11.7749	17.5876	19.5510	20.5348	21.0815	21.4987	22.2582	22.6550	22.8395
50	20	0	66.9045	47.7538	23.9978	35.8615	39.8646	41.8525	42.9967	43.8274	45.3896	46.1931	46.5583
50	20	0.25	66.7231	47.6252	23.9276	35.7655	39.7404	41.7503	42.8716	43.7022	45.2866	46.0455	46.4249
50	20	0.5	66.4267	47.4061	23.8259	35.6164	39.5654	41.5646	42.6684	43.5170	45.0484	45.8628	46.2170
50	20	0.75	66.0370	47.1330	23.6932	35.3956	39.3567	41.3205	42.4201	43.2650	44.7714	45.6053	45.9469
50	20	1	65.6341	46.8690	23.5498	35.1751	39.1021	41.0695	42.1630	42.9974	44.5165	45.3101	45.6790
50	50	0	167.2612	119.3845	59.9946	89.6536	99.6616	104.6312	107.4918	109.5684	113.4740	115.4828	116.3958
50	50	0.25	166.8077	119.0629	59.8191	89.4138	99.3511	104.3759	107.1789	109.2554	113.2165	115.1139	116.0623
50	50	0.5	166.0668	118.5152	59.5647	89.0409	98.9135	103.9115	106.6710	108.7925	112.6210	114.6569	115.5426
50	50	0.75	165.0925	117.8325	59.2331	88.4889	98.3919	103.3011	106.0503	108.1625	111.9286	114.0133	114.8673
50	50	1	164.0853	117.1726	58.8744	87.9378	97.7552	102.6739	105.4075	107.4934	111.2912	113.2752	114.1976

Table 5.12: Average interval length of mean for Crack distribution n = 100 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
2	1	0	0.6562	0.4704	0.2357	0.3530	0.3921	0.4119	0.4233	0.4309	0.4466	0.4548	0.4585
2	1	0.25	0.6305	0.4520	0.2265	0.3396	0.3770	0.3959	0.4072	0.4149	0.4300	0.4376	0.4412
2	1	0.5	0.5922	0.4258	0.2131	0.3195	0.3544	0.3727	0.3833	0.3902	0.4047	0.4117	0.4153
2	1	0.75	0.5375	0.3869	0.1936	0.2902	0.3224	0.3389	0.3482	0.3549	0.3676	0.3742	0.3774
2	1	1	0.4637	0.3338	0.1670	0.2506	0.2785	0.2924	0.3008	0.3063	0.3175	0.3228	0.3257
2	5	0	3.2810	2.3519	1.1783	1.7648	1.9607	2.0594	2.1167	2.1543	2.2330	2.2740	2.2926
2	5	0.25	3.1525	2.2598	1.1324	1.6979	1.8851	1.9796	2.0360	2.0746	2.1498	2.1882	2.2062
2	5	0.5	2.9610	2.1288	1.0653	1.5973	1.7719	1.8634	1.9166	1.9512	2.0234	2.0586	2.0765
2	5	0.75	2.6873	1.9344	0.9679	1.4509	1.6121	1.6944	1.7412	1.7744	1.8381	1.8710	1.8870
2	5	1	2.3183	1.6692	0.8352	1.2529	1.3926	1.4622	1.5040	1.5313	1.5873	1.6140	1.6285
2	10	0	6.5620	4.7038	2.3566	3.5296	3.9214	4.1188	4.2334	4.3086	4.4660	4.5480	4.5851
2	10	0.25	6.3050	4.5197	2.2648	3.3958	3.7703	3.9591	4.0719	4.1492	4.2997	4.3765	4.4124
2	10	0.5	5.9219	4.2575	2.1305	3.1947	3.5438	3.7268	3.8332	3.9025	4.0467	4.1171	4.1530
2	10	0.75	5.3746	3.8688	1.9358	2.9017	3.2241	3.3888	3.4824	3.5488	3.6762	3.7420	3.7741
2	10	1	4.6365	3.3384	1.6703	2.5058	2.7853	2.9244	3.0079	3.0625	3.1745	3.2279	3.2569
2	20	0	13.1240	9.4076	4.7131	7.0591	7.8429	8.2375	8.4668	8.6173	8.9320	9.0959	9.1702
2	20	0.25	12.6099	9.0393	4.5296	6.7916	7.5405	7.9182	8.1439	8.2983	8.5994	8.7529	8.8249
2	20	0.5	11.8439	8.5150	4.2610	6.3893	7.0876	7.4536	7.6665	7.8049	8.0934	8.2342	8.3060
2	20	0.75	10.7493	7.7375	3.8716	5.8034	6.4483	6.7776	6.9648	7.0976	7.3523	7.4840	7.5481
2	20	1	9.2731	6.6768	3.3407	5.0117	5.5706	5.8488	6.0159	6.1250	6.3491	6.4558	6.5138
2	50	0	32.8100	23.5189	11.7828	17.6478	19.6071	20.5938	21.1669	21.5432	22.3299	22.7398	22.9255
2	50	0.25	31.5248	22.5982	11.3241	16.9791	18.8513	19.7956	20.3597	20.7458	21.4984	21.8822	22.0622
2	50	0.5	29.6097	21.2876	10.6526	15.9733	17.7190	18.6339	19.1662	19.5123	20.2335	20.5855	20.7649
2	50	0.75	26.8731	19.3437	9.6790	14.5086	16.1207	16.9441	17.4120	17.7439	18.3808	18.7101	18.8702
2	50	1	23.1827	16.6920	8.3516	12.5291	13.9264	14.6220	15.0397	15.3126	15.8727	16.1396	16.2845
5	1	0	0.8679	0.6191	0.3100	0.4648	0.5163	0.5424	0.5570	0.5678	0.5881	0.5983	0.6036
5	1	0.25	0.8489	0.6057	0.3031	0.4549	0.5051	0.5306	0.5448	0.5553	0.5757	0.5857	0.5909
5	1	0.5	0.8208	0.5864	0.2933	0.4396	0.4884	0.5131	0.5274	0.5374	0.5564	0.5664	0.5716
5	1	0.75	0.7823	0.5585	0.2795	0.4191	0.4656	0.4890	0.5026	0.5123	0.5302	0.5405	0.5443
5	1	1	0.7333	0.5233	0.2621	0.3926	0.4367	0.4584	0.4714	0.4799	0.4973	0.5062	0.5104

Table 5.12 (Cont.): Average interval length of mean for Crack distribution n = 100 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
5	5	0	4.3393	3.0953	1.5501	2.3241	2.5813	2.7119	2.7850	2.8388	2.9405	2.9917	3.0180
5	5	0.25	4.2446	3.0287	1.5155	2.2743	2.5255	2.6531	2.7240	2.7797	2.8782	2.9286	2.9547
5	5	0.5	4.1039	2.9319	1.4663	2.1978	2.4422	2.5656	2.6369	2.6868	2.7821	2.8318	2.8581
5	5	0.75	3.9116	2.7925	1.3976	2.0955	2.3280	2.4448	2.5128	2.5614	2.6508	2.7026	2.7216
5	5	1	3.6661	2.6165	1.3103	1.9630	2.1834	2.2920	2.3572	2.3996	2.4862	2.5310	2.5519
5	10	0	8.6786	6.1906	3.1002	4.6482	5.1626	5.4238	5.5700	5.6777	5.8809	5.9834	6.0361
5	10	0.25	8.4892	6.0574	3.0311	4.5486	5.0509	5.3061	5.4479	5.5594	5.7565	5.8573	5.9094
5	10	0.5	8.2078	5.8639	2.9325	4.3955	4.8844	5.1313	5.2738	5.3735	5.5642	5.6636	5.7162
5	10	0.75	7.8232	5.5850	2.7952	4.1909	4.6560	4.8896	5.0255	5.1227	5.3016	5.4052	5.4433
5	10	1	7.3332	5.2329	2.6206	3.9260	4.3668	4.5840	4.7144	4.7991	4.9725	5.0621	5.1039
5	20	0	17.3572	12.3811	6.2003	9.2965	10.3252	10.8476	11.1400	11.3553	11.7619	11.9668	12.0721
5	20	0.25	16.9784	12.1148	6.0621	9.0971	10.1019	10.6122	10.8959	11.1188	11.5130	11.7146	11.8187
5	20	0.5	16.4156	11.7277	5.8650	8.7911	9.7688	10.2626	10.5475	10.7470	11.1284	11.3272	11.4325
5	20	0.75	15.6463	11.1701	5.5903	8.3818	9.3120	9.7792	10.0510	10.2454	10.6032	10.8104	10.8865
5	20	1	14.6665	10.4659	5.2412	7.8521	8.7337	9.1679	9.4289	9.5982	9.9449	10.1241	10.2077
5	50	0	43.3929	30.9528	15.5008	23.2412	25.8131	27.1190	27.8499	28.3882	29.4047	29.9171	30.1803
5	50	0.25	42.4459	30.2869	15.1554	22.7429	25.2547	26.5306	27.2397	27.7971	28.7824	29.2864	29.5468
5	50	0.5	41.0390	29.3194	14.6626	21.9777	24.4220	25.6565	26.3688	26.8676	27.8209	28.3181	28.5812
5	50	0.75	39.1158	27.9253	13.9757	20.9546	23.2799	24.4480	25.1275	25.6135	26.5081	27.0259	27.2163
5	50	1	36.6661	26.1647	13.1030	19.6302	21.8342	22.9198	23.5722	23.9956	24.8623	25.3104	25.5193
10	1	0	1.1363	0.8082	0.4047	0.6069	0.6740	0.7080	0.7282	0.7412	0.7675	0.7820	0.7886
10	1	0.25	1.1217	0.7978	0.3996	0.5994	0.6654	0.6992	0.7187	0.7324	0.7584	0.7720	0.7789
10	1	0.5	1.1001	0.7829	0.3918	0.5882	0.6527	0.6857	0.7052	0.7182	0.8437	0.7567	0.7637
10	1	0.75	1.0721	0.7630	0.3819	0.5727	0.6365	0.6680	0.6872	0.7002	0.7249	0.7382	0.7439
10	1	1	1.0373	0.7383	0.3697	0.5545	0.6163	0.6460	0.6649	0.6775	0.7020	0.7138	0.7199
10	5	0	5.6812	4.0411	2.0234	3.0347	3.3700	3.5400	3.6407	3.7061	3.8377	3.9099	3.9430
10	5	0.25	5.6087	3.9892	1.9979	2.9972	3.3270	3.4959	3.5933	3.6620	3.7921	3.8598	3.8944
10	5	0.5	5.5004	3.9146	1.9591	2.9409	3.2636	3.4287	3.5260	3.5911	3.7184	3.7834	3.8183
10	5	0.75	5.3607	3.8148	1.9096	2.8635	3.1824	3.3402	3.4360	3.5010	3.6244	3.6908	3.7194
10	5	1	5.1866	3.6917	1.8486	2.7725	3.0813	3.2299	3.3245	3.3877	3.5100	3.5690	3.5994
10	10	0	11.3625	8.0821	4.0468	6.0694	6.7399	7.0800	7.2815	7.4122	7.6753	7.8198	7.8860
10	10	0.25	11.2173	7.9784	3.9958	5.9944	6.6540	6.9918	7.1866	7.3241	7.5841	7.7196	7.7889
10	10	0.5	11.0007	7.8292	3.9182	5.8818	6.5271	6.8574	7.0520	7.1822	7.4368	7.5669	7.6365
10	10	0.75	10.7214	7.6297	3.8192	5.7269	6.3648	6.6804	6.8719	7.0020	7.2489	7.3816	7.4387
10	10	1	10.3732	7.3834	3.6972	5.5449	6.1626	6.4597	6.6491	6.7754	7.0200	7.1379	7.1989

Table 5.12 (Cont.): Average interval length of mean for Crack distribution n = 100 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
10	20	0	22.7249	16.1642	8.0935	12.1388	13.4798	14.1601	14.5629	14.8243	15.3506	15.6396	15.7720
10	20	0.25	22.4347	15.9567	7.9916	11.9887	13.3081	13.9836	14.3732	14.6481	15.1682	15.4392	15.5777
10	20	0.5	22.0014	15.6584	7.8364	11.7636	13.0542	13.7147	14.1040	14.3643	14.8735	15.1338	15.2730
10	20	0.75	21.4428	15.2593	7.6385	11.4538	12.7297	13.3608	13.7438	14.0040	14.4978	14.7631	14.8774
10	20	1	20.7463	14.7667	7.3945	11.0898	12.3252	12.9195	13.2981	13.5507	14.0400	14.2758	14.3977
10	50	0	56.8123	40.4105	20.2338	30.3469	33.6996	35.4002	36.4073	37.0608	38.3766	39.0991	39.4300
10	50	0.25	56.0867	39.8917	19.9791	29.9717	33.2702	34.9589	35.9331	36.6203	37.9206	38.5981	38.9443
10	50	0.5	55.0035	39.1461	19.5910	29.4091	32.6356	34.2868	35.2600	35.9108	37.1838	37.8344	38.1825
10	50	0.75	53.6071	38.1483	19.0961	28.6346	31.8241	33.4021	34.3595	35.0101	36.2444	36.9078	37.1935
10	50	1	51.8658	36.9167	18.4861	27.7245	30.8130	32.2986	33.2453	33.8768	35.0999	35.6896	35.9943
20	1	0	1.5393	1.0942	0.5479	0.8211	0.9116	0.9584	0.9853	1.0041	1.0391	1.0577	1.0664
20	1	0.25	1.5285	1.0870	0.5441	0.8154	0.9056	0.9521	0.9781	0.9973	1.0319	1.0502	1.0591
20	1	0.5	1.5127	1.0759	0.5385	0.8067	0.8959	0.9420	0.9683	0.9872	1.0209	1.0393	1.0475
20	1	0.75	1.4927	1.0615	0.5313	0.7964	0.8841	0.9291	0.9549	0.9749	1.0072	1.0260	1.0334
20	1	1	1.4679	1.0436	0.5226	0.7830	0.8700	0.9133	0.9395	0.9583	0.9907	1.0087	1.0166
20	5	0	7.4634	5.3076	2.6563	3.9822	4.4204	4.6453	4.7743	4.8743	5.0359	5.1302	5.1669
20	5	0.25	7.6427	5.4352	2.7206	4.0767	4.5280	4.7606	4.8907	4.9864	5.1597	5.2512	5.2955
20	5	0.5	7.5634	5.3792	2.6926	4.0335	4.4794	4.7099	4.8415	4.9361	5.1046	5.1967	5.2374
20	5	0.75	7.4634	5.3076	2.6563	3.9822	4.4204	4.6453	4.7743	4.8743	5.0359	5.1302	5.1669
20	5	1	7.3394	5.2181	2.6129	3.9151	4.3498	4.5665	4.6975	4.7913	4.9536	5.0435	5.0830
20	10	0	15.3926	10.9424	5.4789	8.2106	9.1156	9.5844	9.8534	10.0409	10.3911	10.5774	10.6643
20	10	0.25	15.2854	10.8704	5.4412	8.1535	9.0559	9.5212	9.7814	9.9727	10.3194	10.5023	10.5911
20	10	0.5	15.1268	10.7585	5.3851	8.0671	8.9588	9.4199	9.6829	9.8721	10.2092	10.3934	10.4748
20	10	0.75	14.9269	10.6152	5.3127	7.9643	8.8407	9.2906	9.5485	9.7486	10.0718	10.2604	10.3338
20	10	1	14.6788	10.4361	5.2257	7.8303	8.6996	9.1330	9.3950	9.5825	9.9072	10.0870	10.1659
20	20	0	30.7852	21.8849	10.9578	16.4212	18.2312	19.1689	19.7068	20.0819	20.7822	21.1548	21.3286
20	20	0.25	30.5708	21.7408	10.8823	16.3069	18.1119	19.0424	19.5627	19.9454	20.6387	21.0047	21.1821
20	20	0.5	30.2536	21.5169	10.7703	16.1341	17.9176	18.8397	19.3659	19.7442	20.4184	20.7868	20.9496
20	20	0.75	29.8537	21.2303	10.6253	15.9286	17.6815	18.5812	19.0970	19.4973	20.1437	20.5209	20.6676
20	20	1	29.3575	20.8722	10.4515	15.6605	17.3993	18.2659	18.7899	19.1650	19.8145	20.1741	20.3319

Table 5.12 (Cont.): Average interval length of mean for Crack distribution n = 100 (Bootstrap-t)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
20	50	0	76.9631	54.7122	27.3944	41.0531	45.5779	47.9222	49.2670	50.2047	51.9554	52.8871	53.3215
20	50	0.25	76.4269	54.3519	27.2057	40.7673	45.2797	47.6059	48.9067	49.8635	51.5968	52.5116	52.9553
20	50	0.5	75.6339	53.7923	26.9256	40.3353	44.7940	47.0993	48.4146	49.3605	51.0460	51.9670	52.3740
20	50	0.75	76.6343	53.0758	26.5633	39.8216	44.2037	46.4531	47.7425	48.7431	50.3592	51.3021	51.6690
20	50	1	73.3938	52.1805	26.1286	39.1513	43.4982	45.6647	46.9748	47.9126	49.5362	50.4352	50.8297
50	1	0	2.3668	1.6811	0.8420	1.2615	1.4012	1.4716	1.5130	1.5425	1.5960	1.6250	1.6376
50	1	0.25	2.3596	1.6766	0.8395	1.2575	1.3967	1.4674	1.5083	1.5370	1.5909	1.6200	1.6330
50	1	0.5	2.3491	1.6685	0.8358	1.2514	1.3909	1.4612	1.5020	1.5316	1.5839	1.6121	1.6251
50	1	0.75	2.3362	1.6593	0.8311	1.2442	1.3835	1.4527	1.4939	1.5229	1.5758	1.6036	1.6159
50	1	1	2.3204	1.6481	0.8258	1.2362	1.3747	1.4429	1.4836	1.5118	1.5654	1.5935	1.6055
50	5	0	11.8340	8.4053	4.2098	6.3073	7.0058	7.3581	7.5649	7.7126	7.9799	8.1252	8.1878
50	5	0.25	11.7978	8.3830	4.1974	6.2877	6.9837	7.3370	7.5413	7.6850	7.9544	8.1000	8.1649
50	5	0.5	11.7454	8.3423	4.1788	6.2569	6.9543	7.3061	7.5097	7.6578	7.9193	8.0605	8.1254
50	5	0.75	11.6810	8.2964	4.1553	6.2208	6.9176	7.2633	7.4695	7.6147	7.8791	8.0182	8.0793
50	5	1	11.6020	8.2404	4.1288	6.1811	6.8735	7.2146	7.4182	7.5589	7.8272	7.9674	8.0273
50	10	0	23.6680	16.8106	8.4196	12.6147	14.0115	14.7162	15.1297	15.4253	15.9598	16.2504	16.3755
50	10	0.25	23.5956	16.7660	8.3949	12.5753	13.9675	14.6740	15.0825	15.3700	15.9087	16.1999	16.3299
50	10	0.5	23.4909	16.6846	8.3576	12.5138	13.9087	14.6122	15.0195	15.3156	15.8387	16.1211	16.2507
50	10	0.75	23.3619	16.5928	8.3107	12.4415	13.8352	14.5265	14.9389	15.2294	15.7581	16.0363	16.1586
50	10	1	23.2040	16.4808	8.2577	12.3622	13.7471	14.4293	14.8364	15.1178	15.6544	15.9347	16.0545
50	20	0	47.3360	33.6212	16.8393	25.2293	28.0231	29.4323	30.2594	30.8506	31.9195	32.5008	32.7510
50	20	0.25	47.1912	33.5320	16.7898	25.1506	27.9349	29.3481	30.1651	30.7400	31.8174	32.3999	32.6597
50	20	0.5	46.9818	33.3693	16.7152	25.0277	27.8173	29.2244	30.0390	30.6313	31.6773	32.2421	32.5015
50	20	0.75	46.7238	33.1856	16.6214	24.8830	27.6704	29.0531	29.8778	30.4588	31.5163	32.0726	32.3172
50	20	1	46.4080	3.9615	16.5154	24.7243	27.4942	28.8585	29.6728	30.2355	31.3087	31.8694	32.1090
50	50	0	118.3399	84.0529	42.0982	63.0733	70.0577	73.5808	75.6485	77.1264	79.7988	81.2519	81.8775
50	50	0.25	117.9780	83.8300	41.9744	62.8766	69.8372	73.3702	75.4126	76.8500	79.5435	80.9997	81.6492
50	50	0.5	117.4544	83.4232	41.7880	62.5692	69.5433	73.0609	75.0974	76.5781	79.1933	80.6053	81.2537
50	50	0.75	116.8095	82.9639	41.5534	62.2075	69.1759	72.6327	74.6945	76.1469	78.7907	80.1816	80.7930
50	50	1	116.0201	82.4038	41.2884	61.8108	68.7354	72.1463	74.1821	75.5887	78.2718	79.6735	80.2725

Table 5.13: Average interval length of mean for Crack distribution n = 10 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
2	1	0	2.0136	1.3830	0.9943	1.2079	1.2704	1.2981	1.3155	1.3272	1.6501	1.3617	1.3668
2	1	0.25	1.9360	1.3282	0.9562	1.1606	1.2211	1.2480	1.2647	1.2762	1.2977	1.3092	1.3134
2	1	0.5	1.8065	1.2398	0.8927	1.0829	1.1394	1.1646	1.1806	1.1907	1.2104	1.2211	1.2257
2	1	0.75	1.6385	1.1246	0.8087	0.9823	1.0321	1.0559	1.0703	1.0785	1.0970	1.1074	1.1106
2	1	1	1.4019	0.9613	0.6925	0.8408	0.8838	0.9037	0.9166	0.9230	0.9387	0.9473	0.9505
2	5	0	10.0677	6.9149	4.9717	6.0392	6.3520	6.4904	6.5776	6.6362	6.7503	6.8085	6.8341
2	5	0.25	9.6798	6.6412	4.7811	5.8031	6.1056	6.2398	6.3236	6.3812	6.4885	6.5458	6.5672
2	5	0.5	9.0325	6.1990	4.4633	5.4146	5.6972	5.8230	5.9029	5.9534	6.0522	6.1054	6.1287
2	5	0.75	8.1925	5.6231	4.0433	4.9114	5.1604	5.2793	5.3515	5.3924	5.4851	5.5370	5.5529
2	5	1	7.0097	4.8063	3.4627	4.2040	4.4188	4.5187	4.5828	4.6148	4.6933	4.7363	4.7527
2	10	0	20.1355	13.8298	9.9434	12.0785	12.7039	12.9809	13.1552	13.2724	13.5005	13.6169	13.6681
2	10	0.25	19.3595	13.2824	9.5621	11.6061	12.2113	12.4796	12.6471	12.7624	12.9771	13.0917	13.1344
2	10	0.5	18.0650	12.3979	8.9266	10.8291	11.3944	11.6459	11.8057	11.9069	12.1044	12.2107	12.2573
2	10	0.75	16.3851	11.2463	8.0866	9.8228	10.3208	10.5586	10.7031	10.7849	10.9701	11.0741	11.1057
2	10	1	14.0193	9.6126	6.9253	8.4079	8.8376	9.0373	9.1656	9.2296	9.3863	9.4725	9.5054
2	20	0	40.2709	27.6596	19.8868	24.1569	25.4079	25.9618	26.3104	26.5448	27.0010	27.2339	27.3362
2	20	0.25	38.7191	26.5649	19.1243	23.2122	24.4225	24.9592	25.2943	25.5248	25.9541	26.1833	26.2689
2	20	0.5	36.1300	24.7959	17.8532	21.6583	22.7888	23.2919	23.6115	23.8137	24.2089	24.4214	24.5146
2	20	0.75	32.7702	22.4925	16.1732	19.6456	20.6417	21.1172	21.4061	21.5697	21.9402	22.1482	22.2114
2	20	1	28.0387	19.2251	13.8506	16.8158	17.6753	18.0746	18.3312	18.4592	18.7730	18.9451	19.0108
2	50	0	100.6773	69.1489	49.7169	60.3923	63.5197	64.9044	65.7761	66.3619	67.5026	68.0847	68.3405
2	50	0.25	96.7977	66.4121	47.8107	58.0305	61.0563	62.3979	63.2357	63.8120	64.8853	65.4583	65.6721
2	50	0.5	90.3250	61.9896	44.6331	54.1456	46.9720	58.2297	59.0286	59.5343	60.5222	61.0535	61.2865
2	50	0.75	81.9254	56.2314	40.4329	49.1140	51.6041	52.7929	53.5153	53.9242	54.8506	55.3704	55.5285
2	50	1	70.0966	48.0628	34.6265	42.0396	44.1882	45.1866	45.8280	46.1480	46.9325	47.3627	47.5269
5	1	0	2.6804	1.8435	1.3226	1.6087	1.6923	1.7306	1.7519	1.7675	1.7985	1.8150	1.8204
5	1	0.25	2.6220	1.8020	1.2948	1.5722	1.6551	1.6930	1.7140	1.7288	1.7594	1.7741	1.7805
5	1	0.5	2.5231	1.7337	1.2459	1.5137	1.5917	1.6285	1.6510	1.6632	1.6920	1.7072	1.7126
5	1	0.75	2.4014	1.6506	1.1851	1.4410	1.5138	1.5492	1.5717	1.5823	1.6107	1.6256	1.6303
5	1	1	2.2443	1.5422	1.1083	1.3463	1.4153	1.4489	1.4685	1.4775	1.5051	1.5182	1.5245

Table 5.13 (Cont.): Average interval length of mean for Crack distribution n = 10 (Percentile)

λ	v	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
5	5	0	13.4022	9.2175	6.6128	8.0435	8.4616	8.6529	8.7593	8.8376	8.9927	9.0751	9.1020
5	5	0.25	13.1098	9.0102	6.4737	7.8612	8.2754	8.4652	8.5701	8.6437	8.7971	8.8704	8.9023
5	5	0.5	12.6154	8.6684	6.2295	7.5685	7.9586	8.1424	8.2549	8.3159	8.4601	8.5360	8.5630
5	5	0.75	12.0069	8.2531	5.9255	7.2047	7.5688	7.7458	7.8584	7.9116	8.0535	8.1278	8.1513
5	5	1	11.2217	7.7108	5.5417	6.7317	7.0764	7.2445	7.3425	7.3877	7.5254	7.5911	7.6225
5	10	0	26.8044	18.4351	13.2256	16.0871	16.9231	17.3057	17.5187	17.6751	17.9853	18.1502	18.2040
5	10	0.25	26.2195	18.0204	12.9475	15.7224	16.5508	16.9305	17.1403	17.2875	17.5942	17.7408	17.8046
5	10	0.5	25.2308	17.3367	12.4590	15.1370	15.9172	16.2848	16.5097	16.6317	16.8202	17.0719	17.1260
5	10	0.75	24.0138	16.5061	11.8510	14.4095	15.1377	15.4916	15.7169	15.8233	16.1069	16.2557	16.3027
5	10	1	22.4434	15.4216	11.0833	13.4634	14.1428	14.4889	14.6850	14.7753	15.0509	15.1822	15.2451
5	20	0	53.6089	36.8702	26.4512	32.1741	33.8462	34.6114	35.0373	35.3502	35.9706	36.3003	36.4079
5	20	0.25	52.4390	36.0407	25.8950	31.4448	33.1017	33.8609	34.2806	34.5749	35.1883	35.4816	35.6092
5	20	0.5	50.4616	34.6735	24.9180	30.2740	31.8344	32.5697	33.0194	33.2635	33.8404	34.1439	34.2520
5	20	0.75	48.0277	33.0123	23.7020	28.8189	30.2754	30.9832	31.4337	31.6465	32.2139	32.5114	32.6053
5	20	1	44.8869	30.8431	22.1666	26.9267	28.3057	28.9778	29.3700	29.5506	30.1017	30.3643	30.4902
5	50	0	134.0221	92.1754	66.1281	80.4353	84.6156	86.5285	87.5933	88.3756	89.9266	90.7508	91.0199
5	50	0.25	131.0975	90.1018	64.7374	78.6119	82.7542	84.6522	85.7014	86.4373	87.9708	88.7040	89.0230
5	50	0.5	126.1539	86.6837	62.2951	75.6850	79.5859	81.4241	82.5486	83.1587	84.6010	85.3597	85.6299
5	50	0.75	120.0692	82.5306	59.2549	72.0473	75.6884	77.4580	78.5843	79.1162	80.5346	81.2784	81.5134
5	50	1	112.2171	77.1078	55.4165	67.3168	70.7641	72.4446	73.4250	73.8766	75.2543	75.9109	76.2254
10	1	0	3.5211	2.4199	1.7377	2.1129	2.2224	2.2739	2.3036	2.3227	2.3650	2.3855	2.3928
10	1	0.25	3.4749	2.3881	1.7151	2.0836	2.1937	2.2433	2.2740	2.2935	2.3338	2.3532	2.3604
10	1	0.5	3.4007	2.3367	1.6777	2.0389	2.1450	2.1951	2.2257	2.2423	2.2841	2.3035	2.3098
10	1	0.75	3.3089	2.2737	1.6326	1.9832	2.0881	2.1368	2.1660	2.1819	2.2221	2.2417	2.2488
10	1	1	3.1954	2.1948	1.5777	1.9164	2.0169	2.0640	2.0921	2.1064	2.1456	2.1642	2.1723
10	5	0	17.6055	12.0997	8.6885	10.5643	11.1119	11.3696	11.5178	11.6135	11.8249	11.9277	11.9641
10	5	0.25	17.3744	11.9404	8.5757	10.4182	10.9685	11.2165	11.3700	11.4674	11.6689	11.7661	11.8021
10	5	0.5	17.0033	11.6835	8.3883	10.1945	10.7248	10.9756	11.1286	11.2117	11.4206	11.5174	11.5487
10	5	0.75	16.5443	11.3686	8.1629	9.9160	10.4406	10.6840	10.8298	10.9093	11.1106	11.2083	11.2438
10	5	1	15.9769	10.9741	7.8886	9.5817	10.0846	10.3198	10.4605	10.5320	10.7278	10.8212	10.8613
10	10	0	35.2110	24.1994	17.3770	21.1286	22.2238	22.7392	23.0356	23.2271	23.6498	23.8553	23.9281
10	10	0.25	34.7488	23.8809	17.1514	20.8364	21.9371	22.4330	22.7400	22.9348	23.3378	23.5321	23.6041
10	10	0.5	34.0067	23.3670	16.7765	20.3890	21.4497	21.9513	22.2573	22.4233	22.8412	23.0348	23.0975
10	10	0.75	33.0885	22.7372	16.3258	19.8321	20.8812	21.3681	21.6597	21.8185	22.2212	22.4166	22.4875
10	10	1	31.9537	21.9482	15.7772	19.1635	20.1693	20.6397	20.9210	21.0641	21.4555	21.6424	21.7226

Table 5.13 (Cont.): Average interval length of mean for Crack distribution n = 10 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
10	20	0	70.4220	48.3989	34.7539	42.2572	44.4476	45.4784	46.0712	46.4541	47.2996	47.7106	47.8563
10	20	0.25	69.4976	47.7618	34.3029	41.6727	43.8742	44.8660	45.4801	45.8696	46.6757	47.0643	47.2082
10	20	0.5	68.0134	46.7341	33.5531	40.7780	42.8993	43.9026	44.5145	44.8466	45.6825	46.0697	46.1949
10	20	0.75	66.1770	45.4744	32.6516	39.6642	41.7623	42.7362	43.3194	43.6370	44.4423	44.8333	44.9750
10	20	1	63.9074	43.8964	31.5544	38.3270	40.3386	41.2793	41.8419	42.1282	42.9110	43.2848	43.4452
10	50	0	176.0550	120.9972	86.8848	105.6431	111.1190	113.6959	115.1781	116.1353	118.2490	119.2765	119.6406
10	50	0.25	173.7440	119.4044	85.7572	104.1817	109.6854	112.1651	113.7002	114.6740	116.6892	117.6607	118.0205
10	50	0.5	170.0334	116.8352	83.8827	101.9450	107.2482	109.7564	111.2863	112.1165	114.2062	115.1741	115.4873
10	50	0.75	165.4425	113.6860	81.6291	99.1604	104.4058	106.8404	108.2984	109.0926	111.1059	112.0832	112.4376
10	50	1	159.7685	109.7409	78.8859	95.8174	100.8464	103.1983	104.6048	105.3204	107.2775	108.2121	108.6130
20	1	0	4.7819	3.2874	2.3612	2.8709	3.0196	3.0872	3.1309	3.1546	3.2120	3.2392	3.2514
20	1	0.25	4.7448	3.2605	2.3424	2.8475	2.9965	3.0627	3.1063	3.1296	3.1878	3.2143	3.2251
20	1	0.5	4.6879	3.2223	2.3145	2.8125	2.9593	3.0267	3.0696	3.0912	3.1486	3.1750	3.1867
20	1	0.75	4.6222	3.1778	2.2812	2.7726	2.9177	2.9852	3.0261	3.0473	3.1046	3.1307	3.1417
20	1	1	4.5413	3.1212	2.2422	2.7242	2.8686	2.9323	2.9731	2.9936	3.0496	3.0751	3.0863
20	5	0	23.9094	16.4369	11.8061	14.3545	15.0979	15.4361	15.6543	15.7729	16.0602	16.1958	16.2567
20	5	0.25	23.7240	16.3026	11.7121	14.2373	14.9826	15.3136	15.5314	15.6479	15.9392	16.0713	16.1256
20	5	0.5	23.4397	16.1114	11.5723	14.0622	14.7964	15.1337	15.3482	15.4560	15.7430	15.8752	15.9336
20	5	0.75	23.1111	15.8892	11.4061	13.8628	14.5885	14.9259	15.1304	15.2364	15.5230	15.6537	15.7084
20	5	1	22.7063	15.6058	11.2111	13.6212	14.3428	14.6616	14.8655	14.9682	15.2479	15.3755	15.4315
20	10	0	47.8187	32.8739	23.6121	28.7089	30.1957	30.8721	31.3085	31.5459	32.1204	32.3915	32.5135
20	10	0.25	47.4480	32.6051	23.4242	28.4746	29.9653	30.6272	31.0628	31.2957	31.8784	32.1425	32.2512
20	10	0.5	46.8794	32.2227	23.1446	28.1245	29.5928	30.2674	30.6964	30.9120	31.4861	31.7503	31.8672
20	10	0.75	46.2223	31.7783	22.8123	27.7257	29.1771	29.8519	30.2607	30.4728	31.0460	31.3074	31.4167
20	10	1	45.4126	31.2117	22.4223	27.2424	28.6856	29.3232	29.7310	29.9363	30.4958	30.7510	30.8631
20	20	0	95.6375	65.7477	47.2243	57.4178	60.3914	61.7443	62.6171	63.0917	64.2407	64.7831	65.0269
20	20	0.25	94.8960	65.2103	46.8484	56.9492	59.9305	61.2544	62.1257	62.5914	63.7568	64.2850	64.5024
20	20	0.5	93.7589	64.4454	46.2892	56.2489	59.1856	60.5348	61.3928	61.8239	62.9722	63.5006	63.7345
20	20	0.75	92.4446	63.5567	45.6245	55.4513	58.3542	59.7038	60.5214	60.9456	62.0921	62.6149	62.8334
20	20	1	90.8252	62.4234	44.8445	54.4847	57.3713	58.6463	59.4620	59.8726	60.9916	61.5020	61.7262

Table 5.13 (Cont.): Average interval length of mean for Crack distribution n = 10 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
20	50	0	239.0936	164.3693	118.0606	143.5445	150.9786	154.3606	156.5426	157.7293	160.6018	161.9576	162.5674
20	50	0.25	237.2399	163.0256	117.1209	142.3731	149.8263	153.1361	155.3142	156.4786	159.3919	160.7126	161.2559
20	50	0.5	234.3972	161.1135	115.7230	140.6223	147.9639	151.3370	153.4819	154.5598	157.4304	158.7516	159.3361
20	50	0.75	231.1114	158.8917	114.0613	138.6283	145.8854	149.2594	151.3036	152.3639	155.2302	156.5372	157.0835
20	50	1	227.0630	156.0584	112.1112	136.2119	143.4282	146.6158	148.6549	149.6816	152.4790	153.7551	154.3154
50	1	0	7.3554	5.0563	3.6315	4.4139	4.6467	4.7507	4.8157	4.8508	4.9407	4.9812	5.0033
50	1	0.25	7.3283	5.0359	3.6176	4.3967	4.6301	4.7335	4.7984	4.8326	4.9224	4.9622	4.9846
50	1	0.5	7.2900	5.0114	3.5985	4.3737	4.6047	4.7099	4.7729	4.8082	4.8975	4.9374	4.9585
50	1	0.75	7.2476	4.9829	3.5767	4.3479	4.5766	4.6821	4.7437	4.7787	4.8689	4.9074	4.9288
50	1	1	7.1964	4.9471	3.5526	4.3165	4.5464	4.6499	4.7115	4.7438	4.8331	4.8744	4.8953
50	5	0	36.7771	25.2817	18.1577	22.0696	23.2337	23.7535	24.0785	24.2541	24.7036	24.9061	25.0164
50	5	0.25	36.6415	25.1794	18.0877	21.9834	23.1504	23.6676	23.9919	24.1629	24.6117	24.8112	24.9230
50	5	0.5	36.4500	25.0570	17.9924	21.8682	23.0233	23.5496	23.8643	24.0409	24.4876	24.6869	24.7927
50	5	0.75	36.2382	24.9145	17.8833	21.7395	22.8831	23.4105	23.7185	23.8934	24.3443	24.5369	24.6439
50	5	1	35.9818	24.7354	17.7628	21.5826	22.7319	23.2495	23.5574	23.7190	24.1653	24.3722	24.4765
50	10	0	73.5542	50.5633	36.3154	44.1392	46.4673	47.5069	48.1571	48.5081	49.4071	49.8122	50.0328
50	10	0.25	73.2829	50.3587	36.1755	43.9668	46.3008	47.3352	47.9839	48.3258	49.2235	49.6224	49.8460
50	10	0.5	72.8999	50.1140	35.9848	43.7365	46.0466	47.0991	47.7286	48.0818	48.9751	49.3739	49.5854
50	10	0.75	72.4764	49.8290	35.7667	43.4790	45.7663	46.8211	47.4370	47.7867	48.6885	49.0738	49.2878
50	10	1	71.9636	49.4707	35.5255	43.1652	45.4638	46.7990	47.1148	47.4381	48.3306	48.7444	48.9529
50	20	0	147.1083	101.1267	72.6307	88.2783	92.9346	95.0139	96.3142	97.0162	98.8142	99.6245	100.0657
50	20	0.25	146.5658	100.7175	72.3510	87.9337	92.6016	94.6704	95.9678	96.6516	98.4470	99.2447	99.6920
50	20	0.5	145.7998	100.2281	71.9695	87.4729	92.0931	94.1983	95.4572	96.1637	97.9503	98.7477	99.1709
50	20	0.75	144.9528	99.6581	71.5334	86.9579	91.5325	93.6422	94.8741	95.5735	97.3771	98.1476	98.5757
50	20	1	143.9272	98.9415	71.0510	86.3304	90.9275	92.9979	94.2297	94.8761	96.6612	97.4889	97.9059
50	50	0	367.7707	252.8167	181.5768	220.6957	232.3366	237.5347	240.7854	242.5405	247.0355	249.0611	250.1642
50	50	0.25	366.4145	251.7936	180.8775	219.8342	231.5041	236.6759	239.9194	241.6289	246.1174	248.1118	249.2299
50	50	0.5	364.4995	250.5702	179.9238	218.6823	230.2328	235.4957	238.6431	240.4092	244.8757	246.8693	247.9271
50	50	0.75	362.3819	249.1451	178.8334	217.3948	228.8313	234.1054	237.1852	238.9337	243.4427	245.3690	246.4392
50	50	1	359.8179	247.3536	177.6275	215.8261	227.3188	232.4948	235.5741	237.1903	241.6529	243.7222	244.7646

Table 5.14: Average interval length of mean for Crack distribution n = 50 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
2	1	0	0.9228	0.6474	0.4604	0.5625	0.5928	0.6063	0.6151	0.6205	0.6320	0.6367	0.6401
2	1	0.25	0.8854	0.6213	0.4416	0.5396	0.5690	0.5821	0.5897	0.5952	0.6062	0.6110	0.6141
2	1	0.5	0.8288	0.5822	0.4135	0.5045	0.5326	0.5447	0.5527	0.5575	0.5670	0.5720	0.5749
2	1	0.75	0.7504	0.5263	0.3745	0.4569	0.4818	0.4932	0.5003	0.5047	0.5133	0.5183	0.5204
2	1	1	0.6494	0.4553	0.3242	0.3957	0.4168	0.4263	0.4326	0.4371	0.4443	0.4483	0.4504
2	5	0	4.6142	3.2372	2.3021	2.8123	2.9638	3.0313	3.0752	3.1027	3.1600	3.1834	3.2006
2	5	0.25	4.4271	3.1063	2.2080	2.6978	2.8451	2.9104	2.9484	2.9760	3.0307	3.0549	3.0705
2	5	0.5	4.1440	2.9108	2.0676	2.5224	2.6630	2.7233	2.7635	2.7877	2.8351	2.8600	2.8743
2	5	0.75	3.7520	2.6316	1.8724	2.2843	2.4091	2.4660	2.5015	2.5236	2.5664	2.5913	2.6020
2	5	1	3.2472	2.2763	1.6209	1.9783	2.0839	2.1316	2.1628	2.1856	2.2215	2.2415	2.2519
2	10	0	9.2284	6.4744	4.6042	5.6247	5.9275	6.0626	6.1505	6.2054	6.3201	6.3668	6.4011
2	10	0.25	8.8541	6.2125	4.4160	5.3956	5.6902	5.8208	5.8968	5.9520	6.0615	6.1097	6.1410
2	10	0.5	8.2879	5.8216	4.1353	5.0448	5.3260	5.4466	5.5270	5.5753	5.6701	5.7200	5.7486
2	10	0.75	7.5040	5.2632	3.7449	4.5686	4.8183	4.9321	5.0029	5.0472	5.1327	5.1825	5.2040
2	10	1	6.4944	4.5527	3.2417	3.9567	4.1677	4.2632	4.3255	4.3711	4.4430	4.4830	4.5038
2	20	0	18.4569	12.9488	9.2084	11.2494	11.8550	12.1253	12.3009	12.4107	12.6402	12.7336	12.8022
2	20	0.25	17.7083	12.4251	8.8319	10.7913	11.3803	11.6416	11.7936	11.9041	12.1229	12.2194	12.2820
2	20	0.5	16.5759	11.6432	8.2705	10.0896	10.6521	10.8932	11.0540	11.1507	11.3402	11.4400	11.4973
2	20	0.75	15.0080	10.5263	7.4898	9.1372	9.6365	9.8641	10.0059	10.0944	10.2655	10.3651	10.4081
2	20	1	12.9888	9.1054	6.4835	7.9134	8.3354	8.5263	8.6510	8.7423	8.8860	8.9660	9.0076
2	50	0	46.1421	32.3720	23.0209	28.1234	29.6375	30.3132	30.7523	31.0267	31.6004	31.8340	32.0056
2	50	0.25	44.2706	31.0627	22.0799	26.9782	28.4508	29.1040	29.4840	29.7602	30.3073	30.5486	30.7050
2	50	0.5	41.4397	29.1080	20.6764	25.2240	26.6302	27.2330	27.6349	27.8766	28.3506	28.5999	28.7432
2	50	0.75	37.5201	26.3158	18.7244	22.8429	24.0913	24.6603	25.0147	25.2359	25.6636	25.9127	26.0202
2	50	1	32.4720	22.7634	16.2087	19.7834	20.8385	21.3158	21.6275	21.8557	22.2149	22.4149	22.5189
5	1	0	1.2228	0.8581	0.6099	0.7447	0.7857	0.8037	0.8145	0.8223	0.8377	0.8441	0.8481
5	1	0.25	1.1956	0.8391	0.5965	0.7280	0.7680	0.7860	0.7969	0.8045	0.8189	0.8255	0.8295
5	1	0.5	1.1546	0.8102	0.5761	0.7025	0.7415	0.7592	0.7699	0.7766	0.7904	0.7973	0.8008
5	1	0.75	1.0997	0.7721	0.5490	0.6693	0.7060	0.7234	0.7334	0.7403	0.7523	0.7593	0.7631
5	1	1	1.0331	0.7253	0.5154	0.6291	0.6632	0.6794	0.6888	0.6955	0.7069	0.7131	0.7167

Table 5.14 (Cont.): Average interval length of mean for Crack distribution n = 50 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
5	5	0	6.1141	4.2905	3.0495	3.7235	3.9286	4.0183	4.0725	4.1113	4.1887	4.2205	4.2404
5	5	0.25	5.9781	4.1957	2.9827	3.6401	3.8398	3.9302	3.9847	4.0223	4.0943	4.1274	4.1474
5	5	0.5	5.7730	4.0510	2.8803	3.5126	3.7075	3.7957	3.8493	3.8828	3.9521	3.9863	4.0038
5	5	0.75	5.4985	3.8606	2.7448	3.3465	3.5298	3.6171	3.6668	3.7012	3.7616	3.7965	3.8154
5	5	1	5.1657	3.6264	2.5769	3.1456	3.3159	3.3972	3.4439	3.4773	3.5346	3.5654	3.5835
5	10	0	12.2282	8.5810	6.0989	7.4470	7.8573	8.0367	8.1450	8.2226	8.3774	8.4410	8.4808
5	10	0.25	11.9562	8.3913	5.9654	7.2802	7.6795	7.8604	7.9694	8.0446	8.1887	8.2548	8.2947
5	10	0.5	11.5460	8.1020	5.7605	7.0252	7.4150	7.5915	7.6985	7.7655	7.9042	7.9725	8.0077
5	10	0.75	10.9970	7.7213	5.4895	6.6930	7.0600	7.2342	7.3335	7.4025	7.5232	7.5929	7.6308
5	10	1	10.3314	7.2528	5.1537	6.2912	6.6319	6.7944	6.8879	6.9545	7.0692	7.1309	7.1669
5	20	0	24.4565	17.1619	12.1979	14.8941	15.7146	16.0733	16.2900	16.4453	16.7549	16.8820	16.9617
5	20	0.25	23.9123	16.7826	11.9308	14.5604	15.3591	15.7208	15.9389	16.0891	16.3773	16.5096	16.5895
5	20	0.5	23.0920	16.2040	11.5210	14.0505	14.8300	15.1829	15.3971	15.5310	15.8084	15.9451	16.0154
5	20	0.75	21.9940	15.4426	10.9791	13.3860	14.1194	14.4684	14.6671	14.8049	15.0465	15.1858	15.2616
5	20	1	20.6629	14.5055	10.3074	12.5824	13.2637	13.5887	13.7757	13.9090	14.1384	14.2617	14.3338
5	50	0	61.1411	42.9048	30.4946	37.2352	39.2864	40.1833	40.7250	41.1131	41.8871	42.2050	42.4042
5	50	0.25	59.7808	41.9565	29.8270	36.4010	38.3977	39.3020	39.8472	40.2228	40.9433	41.2739	41.4736
5	50	0.5	57.7299	40.5099	28.8026	35.1261	37.0750	37.9573	38.4927	38.8276	39.5209	39.8627	40.0384
5	50	0.75	54.9849	38.6064	27.4477	33.4649	35.2984	36.1710	36.6676	37.0123	37.6162	37.9645	38.1539
5	50	1	51.6572	36.2638	25.7685	31.4560	33.1592	33.9719	34.4392	34.7725	35.3461	35.6543	35.8346
10	1	0	1.6033	1.1255	0.7990	0.9764	1.0299	1.0546	1.0687	1.0785	1.0980	1.1068	1.1124
10	1	0.25	1.5827	1.1106	0.7890	0.9636	1.0167	1.0414	1.0549	1.0651	1.0844	1.0928	1.0981
10	1	0.5	1.5515	1.0893	0.7735	0.9446	0.9962	1.0205	1.0348	1.0442	1.0622	1.0717	1.0761
10	1	0.75	1.5116	1.0607	0.7538	0.9199	0.9708	0.9946	1.0085	1.0179	1.0347	1.0437	1.0488
10	1	1	1.4652	1.0287	0.7307	0.8922	0.9407	0.9633	0.9770	0.9862	1.0030	1.0114	1.0161
10	5	0	8.0162	5.6277	3.9951	4.8821	5.1493	5.2728	5.3435	5.3925	5.4899	5.5342	5.5621
10	5	0.25	7.9135	5.5528	3.9450	4.8180	5.0834	5.2071	5.2745	5.3256	5.4221	5.4640	5.4903
10	5	0.5	7.7575	5.4463	3.8677	4.7229	4.9810	5.1023	5.1740	5.2209	5.3108	5.3584	5.3805
10	5	0.75	7.5578	5.3037	3.7691	4.5995	4.8541	4.9728	5.0423	5.0895	5.1733	5.2184	5.2442
10	5	1	7.3260	5.1436	3.6535	4.4610	4.7037	4.8164	4.8852	4.9308	5.0148	5.0570	5.0803
10	10	0	16.0325	11.2553	7.9901	9.7643	10.2985	10.5456	10.6870	10.7850	10.9797	11.0684	11.1242
10	10	0.25	15.8269	11.1056	7.8900	9.6361	10.1668	10.4141	10.5490	10.6512	10.8442	10.9280	10.9807
10	10	0.5	15.5151	10.8926	7.7354	9.4459	9.9620	10.2046	10.3480	10.4418	10.6215	10.7169	10.7609
10	10	0.75	15.1157	10.6074	7.5382	9.1990	9.7083	9.9456	10.0845	10.1790	10.3466	10.4368	10.4883
10	10	1	14.6519	10.2873	7.3069	8.9221	9.4074	9.6329	9.7704	9.8615	10.0297	10.1140	10.1607

Table 5.14 (Cont.): Average interval length of mean for Crack distribution n = 50 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
10	20	0	32.0650	22.5106	15.9802	19.5285	20.5970	21.0913	21.3741	21.5699	21.9594	22.1368	22.2483
10	20	0.25	31.6539	22.2111	15.7800	19.2721	20.3335	20.8283	21.0980	21.3025	21.6885	21.8560	21.9613
10	20	0.5	31.0301	21.7852	15.4708	18.8917	19.9241	20.4092	20.6960	20.8835	21.2430	21.4338	21.5218
10	20	0.75	30.2313	21.2148	15.0764	18.3980	19.4165	19.8912	20.1691	20.3580	20.6932	20.8737	20.9766
10	20	1	29.3039	20.5745	14.6138	17.8442	18.8148	19.2658	19.5408	19.7230	20.0593	20.2281	20.3214
10	50	0	80.1624	56.2765	39.9506	48.8213	51.4926	52.7281	53.4352	53.9249	54.8985	55.3421	55.6208
10	50	0.25	79.1347	55.5279	39.4500	48.1803	50.8337	52.0707	52.7449	53.2562	54.2211	54.6400	54.9034
10	50	0.5	77.5753	54.4629	38.6771	47.2294	49.8102	51.0231	51.7399	52.2087	53.1075	53.5844	53.8045
10	50	0.75	75.5783	53.0370	37.6910	45.9951	48.5413	49.7280	50.4227	5.0895	51.7330	52.1842	52.4416
10	50	1	73.2597	51.4363	36.5346	44.6104	47.0370	48.1644	48.8519	49.3076	50.1483	50.5702	50.8034
20	1	0	2.1738	1.5268	1.0835	1.3228	1.3954	1.4297	1.4490	1.4633	1.4890	1.5017	1.5084
20	1	0.25	2.1591	1.5157	1.0761	1.3139	1.3852	1.4203	1.4391	1.4534	1.4789	1.4912	1.4981
20	1	0.5	2.1367	1.5007	1.0652	1.3003	1.3722	1.4059	1.4241	1.4375	1.4631	1.4760	1.4819
20	1	0.75	2.1069	1.4794	1.0504	1.2822	1.3531	1.3863	1.4039	1.4182	1.4426	1.4556	1.4609
20	1	1	2.0745	1.4574	1.0339	1.2623	1.3323	1.3647	1.3823	1.3961	1.4201	1.4322	1.4385
20	5	0	10.8692	7.6339	5.4175	6.6142	6.9770	7.1486	7.2448	7.3164	7.4449	7.5082	7.5422
20	5	0.25	10.7957	7.5786	5.3804	6.5693	6.9260	7.1017	7.1955	7.2670	7.3943	7.4559	7.4907
20	5	0.5	10.6833	7.5034	5.3262	6.5014	6.8611	7.0296	7.1203	7.1875	7.3154	7.3801	7.4094
20	5	0.75	10.5347	7.3971	5.2522	6.4112	6.7653	6.9314	7.0197	7.0909	7.2132	7.2782	7.3043
20	5	1	10.3726	7.2870	5.1696	6.3113	6.6614	6.8234	6.9114	6.9804	7.1004	7.1609	7.1925
20	10	0	21.7384	15.2677	10.8349	13.2284	13.9541	14.2972	14.4896	14.6327	14.8898	15.0165	15.0844
20	10	0.25	21.5914	15.1572	10.7608	13.1386	13.8520	14.2034	14.3909	14.5340	14.7886	14.9119	14.9813
20	10	0.5	21.3665	15.0068	10.6524	13.0028	13.7221	14.0592	14.2406	14.3749	14.6307	14.7602	14.8189
20	10	0.75	21.0695	14.7942	10.5044	12.8224	13.5306	13.8629	14.0394	14.1819	14.4264	14.5564	14.6086
20	10	1	20.7453	14.5739	10.3392	12.6227	13.3228	13.6469	13.8228	13.9608	14.2008	14.3217	14.3850
20	20	0	43.4768	30.5354	21.6698	26.4569	27.9081	28.5944	28.9792	29.2654	29.7797	30.0330	30.1688
20	20	0.25	43.1828	30.3143	21.5215	26.2771	27.7039	28.4067	28.7818	29.0679	29.5771	29.8237	29.9626
20	20	0.5	42.7330	30.0137	21.3048	26.0055	27.4442	28.1184	28.4813	28.7498	29.2615	29.5204	29.6378
20	20	0.75	42.1389	29.5885	21.0088	25.6449	27.0612	27.7257	28.0788	28.3637	28.8528	29.1129	29.2171
20	20	1	41.4905	29.1478	20.6783	25.2453	26.6456	27.2938	27.6455	27.9215	28.4017	28.6434	28.7699

Table 5.14 (Cont.): Average interval length of mean for Crack distribution n = 50 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
20	50	0	108.6921	76.3385	54.1745	66.1421	69.7704	71.4859	72.4480	73.1635	74.4492	75.0824	75.4220
20	50	0.25	107.9570	75.7858	53.8038	65.6929	69.2599	71.0168	71.9546	72.6698	73.9428	74.5593	74.9065
20	50	0.5	106.8326	75.0341	53.2619	65.0138	68.6105	70.2960	71.2032	71.8746	73.1537	73.8009	74.0945
20	50	0.75	105.3472	73.9712	52.5219	64.1122	67.6530	69.3143	70.1970	70.9093	72.1320	72.7821	73.0428
20	50	1	103.7263	72.8696	51.6959	63.1133	66.6140	68.2344	69.1137	69.8037	71.0042	71.6086	71.9249
50	1	0	3.3452	2.3485	1.6669	2.0352	2.1483	2.2007	2.2295	2.2514	2.2907	2.3109	2.3202
50	1	0.25	3.3362	2.3415	1.6623	2.0301	2.1415	2.1955	2.2227	2.2457	2.2852	2.3056	2.3132
50	1	0.5	3.3213	2.3314	1.6550	2.0211	2.1321	2.1855	2.2128	2.2354	2.2742	2.2963	2.3035
50	1	0.75	3.3019	2.3178	1.6455	2.0090	2.1200	2.1731	2.1998	2.2227	2.2606	2.2824	2.2895
50	1	1	3.2817	2.3043	1.6353	1.9961	2.1072	2.1596	2.1859	2.2086	2.2465	2.2675	2.2758
50	5	0	16.7261	11.7426	8.3344	10.1760	10.7417	11.0033	11.1476	11.2572	11.4535	11.5545	11.6008
50	5	0.25	16.6808	11.7075	8.3115	10.1503	10.7074	10.9774	11.1133	11.2285	11.4260	11.5281	11.5657
50	5	0.5	16.6067	11.6571	8.2750	10.1052	10.6605	10.8277	11.0640	11.1771	11.3708	11.4813	11.5173
50	5	0.75	16.5092	11.5892	8.2276	10.0451	10.6002	10.8652	10.9992	11.1132	11.3031	11.4120	11.4477
50	5	1	16.4085	11.5213	8.1764	9.9803	10.5360	10.7980	10.9295	11.0432	11.2324	11.3375	11.3789
50	10	0	33.4522	23.4852	16.6689	20.3519	21.4833	22.0065	22.2952	22.5143	22.9069	23.1089	23.2017
50	10	0.25	33.3615	23.4149	16.6230	20.3006	21.4147	21.9548	22.2266	22.4570	22.8521	23.0562	23.1315
50	10	0.5	33.2134	23.3141	16.5500	20.2105	21.3210	21.8554	22.1281	22.3542	22.7415	22.9626	23.0346
50	10	0.75	33.0185	23.1783	16.4552	20.0903	21.2003	21.7305	21.9983	22.2265	22.6061	22.8240	22.8954
50	10	1	32.8171	23.0426	16.3527	19.9606	21.0720	21.5960	21.8591	22.0864	22.4648	22.6750	22.7577
50	20	0	66.9045	46.9703	33.3378	40.7039	42.9666	44.0131	44.5904	45.0286	45.8138	46.2178	46.4033
50	20	0.25	66.7231	46.8298	33.2460	40.6013	42.8294	43.9097	44.4531	44.9140	45.7042	46.1124	46.2630
50	20	0.5	66.4267	46.6283	33.1001	40.4209	42.6419	43.7108	44.2561	44.7084	45.4830	45.9251	46.0691
50	20	0.75	66.0370	46.3566	32.9104	40.1805	42.4006	43.4610	43.9966	44.4530	45.2122	45.6481	45.7908
50	20	1	65.6341	46.0852	32.7054	39.9213	42.1440	43.1920	43.7181	44.1728	44.9296	45.3500	45.5155
50	50	0	167.2612	117.4258	83.3444	101.7597	107.4166	110.0327	111.4760	112.5715	114.5345	115.5445	116.0083
50	50	0.25	166.8077	117.0745	83.1149	101.5032	107.0735	109.7742	111.1328	112.2849	114.2604	115.2810	115.6575
50	50	0.5	166.0668	116.5706	82.7502	101.0523	106.6048	109.2770	110.6403	111.7709	113.7075	114.8128	115.1728
50	50	0.75	165.0925	115.8915	82.2761	100.4513	106.0015	108.6524	109.9915	111.1325	113.0305	114.1202	114.4770
50	50	1	164.0853	115.2131	81.7636	99.8032	105.3599	107.9800	109.2953	110.4321	112.3240	113.3750	113.7886

Table 5.15: Average interval length of mean for Crack distribution n = 100 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
2	1	0	0.6562	0.4617	0.3274	0.4003	0.4221	0.4328	0.4385	0.4421	0.4502	0.4543	0.4559
2	1	0.25	0.6305	0.4433	0.3144	0.3848	0.4053	0.4155	0.4213	0.4251	0.4330	0.4365	0.4382
2	1	0.5	0.5922	0.4169	0.2954	0.3614	0.3803	0.3904	0.3959	0.3992	0.4065	0.4102	0.4118
2	1	0.75	0.5375	0.3783	0.2679	0.3278	0.3454	0.3544	0.3589	0.3626	0.3689	0.3724	0.3738
2	1	1	0.4637	0.3261	0.2310	0.2828	0.2984	0.3057	0.3099	0.3126	0.3183	0.3209	0.3222
2	5	0	3.2810	2.3087	1.6369	2.0016	2.1103	2.1638	2.1922	2.2102	2.2508	2.2715	2.2797
2	5	0.25	3.1525	2.2167	1.5719	1.9239	2.0265	2.0775	2.1065	2.1253	2.1649	2.1823	2.1912
2	5	0.5	2.9610	2.0846	1.4770	1.8070	1.9017	1.9520	1.9793	1.9960	2.0326	2.0510	2.0588
2	5	0.75	2.6873	1.8913	1.3394	1.6388	1.7267	1.7720	1.7947	1.8129	1.8443	1.8618	1.8690
2	5	1	2.3183	1.6302	1.1552	1.4141	1.4918	1.5285	1.5494	1.5631	1.5917	1.6046	1.6111
2	10	0	6.5620	4.6173	3.2739	4.0032	4.2206	4.3275	4.3845	4.4203	4.5016	4.5431	4.5594
2	10	0.25	6.3050	4.4334	3.1439	3.8478	4.0529	4.1551	4.2130	4.2506	4.3299	4.3646	4.3823
2	10	0.5	5.9219	4.1692	2.9540	3.6138	3.8034	3.9039	3.9586	3.9920	4.0652	4.1020	4.1176
2	10	0.75	5.3746	3.7826	2.6788	3.2775	3.4535	3.5441	3.5894	3.6258	3.6885	3.7236	3.7379
2	10	1	4.6365	3.2605	2.3104	2.8281	2.9836	3.0571	3.0987	3.1263	3.1834	3.2092	3.2222
2	20	0	13.1240	99.2347	6.5477	8.0065	8.4413	8.6551	8.7689	8.8406	9.0031	9.0862	9.1188
2	20	0.25	12.6099	8.8667	6.2877	7.6955	8.1058	8.3101	8.4260	8.5012	8.6598	8.7293	8.7647
2	20	0.5	11.8439	8.3384	5.9079	7.2276	7.6067	7.8079	7.9172	7.9840	8.1304	8.2041	8.2352
2	20	0.75	10.7493	7.5652	5.3576	6.5551	6.9069	7.0881	7.1789	7.2517	7.3771	7.4472	7.4758
2	20	1	9.2731	6.5209	4.6208	5.6562	5.9671	6.1142	6.1975	6.2526	6.3667	6.4185	6.4444
2	50	0	32.8100	23.0867	16.3693	20.0162	21.1032	21.6377	21.9223	22.1015	22.5079	22.7154	22.7969
2	50	0.25	31.5248	22.1668	15.7193	19.2389	20.2645	20.7752	21.0649	21.2530	21.6494	21.8232	21.9117
2	50	0.5	29.6097	20.8461	14.7698	18.0691	19.0167	19.5196	19.7931	19.9600	20.3260	20.5102	20.5880
2	50	0.75	26.8731	18.9129	13.3941	16.3876	17.2673	17.7204	17.9471	18.1292	18.4427	18.6179	18.6895
2	50	1	23.1827	16.3023	11.5521	14.1406	14.9178	15.2854	15.4937	15.6314	15.9168	16.0461	16.1111
5	1	0	0.8679	0.6112	0.4328	0.5299	0.5581	0.5727	0.5801	0.5851	0.5956	0.6009	0.6034
5	1	0.25	0.8489	0.5979	0.4229	0.5182	0.5459	0.5600	0.5671	0.5729	0.5828	0.5882	0.5906
5	1	0.5	0.8208	0.5783	0.4090	0.5008	0.8280	0.5411	0.5485	0.5537	0.5632	0.5687	0.5709
5	1	0.75	0.7823	0.5507	0.3899	0.4771	0.5033	0.5155	0.5228	0.5277	0.5365	0.5425	0.5439
5	1	1	0.7333	0.5160	0.3654	0.4471	0.4717	0.4834	0.4902	0.4944	0.5032	0.5078	0.5097

Table 5.15 (Cont.): Average interval length of mean for Crack distribution n = 100 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
5	5	0	4.3393	3.0561	2.1638	2.6493	2.7906	2.8634	2.9004	2.9253	2.9779	3.0044	3.0172
5	5	0.25	4.2446	2.9894	2.1143	2.5910	2.7295	2.7999	2.8356	2.8646	2.9139	2.9408	2.9528
5	5	0.5	4.1039	2.8914	2.0449	2.5041	2.6401	2.7057	2.7423	2.7683	2.8162	2.8435	2.8547
5	5	0.75	3.9116	2.7536	1.9493	2.3857	2.5163	2.5775	2.6139	2.6384	2.6827	2.7126	2.7196
5	5	1	3.6666	2.5802	1.8271	2.2357	2.3585	2.4169	2.4508	2.4719	2.5158	2.5392	2.5485
5	10	0	8.6786	6.1122	4.3276	5.2987	5.5812	5.7269	5.8008	5.8506	5.9557	6.0087	6.0344
5	10	0.25	8.4892	5.9788	4.2286	5.1821	5.4590	5.5999	5.6712	5.7292	5.8279	5.8816	5.9057
5	10	0.5	8.2078	5.7828	4.0897	5.0081	5.2801	5.4114	5.4846	5.5367	5.6324	5.6871	5.7093
5	10	0.75	7.8232	5.5071	3.8986	4.7713	5.0327	5.1551	5.2279	5.2768	5.3654	5.4252	5.4391
5	10	1	7.3332	5.1604	3.6542	4.4713	4.7169	4.8338	4.9015	4.9437	5.0316	5.0784	5.0971
5	20	0	17.3572	12.2243	8.6551	10.5974	11.1623	11.4538	11.6017	11.7013	11.9114	12.0174	12.0687
5	20	0.25	16.9784	11.9576	8.4572	10.3641	10.9179	11.1998	11.3425	11.4584	11.6557	11.7632	11.8113
5	20	0.5	16.4156	11.5655	8.1795	10.0162	10.5602	10.8229	10.9693	11.0733	11.2649	11.3742	11.4186
5	20	0.75	15.6463	110.1423	7.7973	9.5427	10.0654	10.3102	10.4557	10.5536	10.7308	10.8505	10.8782
5	20	1	14.6665	10.3208	7.3085	8.9426	9.4338	9.6677	9.8030	9.8874	10.0632	10.1569	10.1941
5	50	0	43.3929	30.5608	21.6378	26.4934	27.9058	28.6344	23.0041	29.2531	29.7785	30.0435	30.1718
5	50	0.25	42.4459	29.8940	21.1431	25.9103	27.2948	27.9994	28.3562	28.6461	29.1394	29.4081	29.5282
5	50	0.5	41.0390	28.9138	20.4486	25.0405	26.4006	27.0572	27.4232	27.6832	28.1622	28.4354	28.5465
5	50	0.75	39.1158	27.5356	19.4932	23.8567	25.1635	25.7754	26.1393	26.3840	26.8271	27.1261	27.1955
5	50	1	36.6661	25.8021	18.2712	22.3566	23.5845	24.1691	24.5076	24.7186	25.1580	25.3922	25.4852
10	1	0	1.1363	0.8000	0.5663	0.6935	0.7304	0.7492	0.7598	0.7660	0.7795	0.7873	0.7902
10	1	0.25	1.1217	0.7898	0.5590	0.6850	0.7210	0.7396	0.7495	0.7568	0.7698	0.7770	0.7803
10	1	0.5	1.1001	0.7747	0.5481	0.6720	0.7074	0.7250	0.7355	0.7423	0.7551	0.7620	0.7653
10	1	0.75	1.0721	0.7549	0.5343	0.6541	0.6895	0.7066	0.7171	0.7232	0.7358	0.7429	0.7459
10	1	1	1.0373	0.7304	0.5171	0.6333	0.6676	0.6832	0.6933	0.7001	0.7125	0.7183	0.7214
10	5	0	5.6812	4.0000	2.8315	3.4673	3.6520	3.7458	3.7988	3.8299	3.8977	3.9362	3.9510
10	5	0.25	0.0000	3.9491	2.7948	3.4252	3.6050	3.6981	3.7473	3.7838	3.8490	3.8851	3.9017
10	5	0.5	5.5004	3.8735	2.7406	3.3600	3.5367	3.6252	3.6777	3.7116	3.7753	3.8099	3.8264
10	5	0.75	5.3607	3.7746	2.6714	3.2705	3.4476	3.5327	3.5856	3.6158	3.6790	3.7146	3.7292
10	5	1	5.1866	3.6520	2.5855	3.1664	3.3379	3.4160	3.4664	3.5005	3.5625	3.5915	3.6067
10	10	0	11.3625	8.0000	5.6630	6.9346	7.3041	7.4915	7.5976	7.6597	7.7954	7.8725	7.9020
10	10	0.25	11.2173	7.8982	5.5897	6.8504	7.2100	7.3963	7.4947	7.5677	7.6980	7.7701	7.8034
10	10	0.5	11.0007	7.7469	5.4813	6.7200	7.0735	7.2504	7.3554	7.4231	7.5506	7.6199	7.6528
10	10	0.75	10.7214	7.5492	5.3428	6.5409	6.8951	7.0655	7.1712	7.2316	7.3580	7.4291	7.4585
10	10	1	10.3732	7.3040	5.1710	6.3327	6.6758	6.8320	6.9329	7.0011	7.1249	7.1829	7.2135

Table 5.15 (Cont.): Average interval length of mean for Crack distribution n = 100 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
10	20	0	22.7249	16.0000	11.3260	13.8692	14.6082	14.9831	15.1953	15.3194	15.5908	15.7450	15.8040
10	20	0.25	22.4347	15.7964	11.1794	13.7007	14.4200	14.7925	14.9893	15.1353	15.3959	15.5402	15.6068
10	20	0.5	22.0014	15.4938	10.9625	13.4399	14.1469	14.5009	14.7107	14.8462	15.1013	15.2398	15.3057
10	20	0.75	21.4428	15.0983	10.6856	13.0819	13.7902	14.1309	14.3424	14.4632	14.7160	14.8582	14.9170
10	20	1	20.7463	14.6080	10.3420	12.6655	13.3517	13.6640	13.8658	14.0021	14.2499	14.3659	14.4269
10	50	0	56.8123	40.0001	28.3150	34.6731	36.5204	37.4577	37.9881	38.2985	38.9770	39.3624	39.5099
10	50	0.25	56.0867	39.4911	27.9484	34.2518	36.0499	36.9813	37.4733	37.8383	38.4898	38.8505	39.0169
10	50	0.5	55.0035	38.7346	27.4063	33.5998	35.3673	36.2522	36.7768	37.1155	37.7532	38.0994	38.2642
10	50	0.75	53.6071	37.7458	26.7139	32.7047	34.4755	35.3273	35.8560	36.1580	36.7899	37.1455	37.2924
10	50	1	51.8658	36.5201	25.8549	31.6636	33.3792	34.1601	34.6644	35.0053	35.6247	35.9146	36.0673
20	1	0	1.5393	1.0845	0.7674	0.9393	0.9893	1.0151	1.0290	1.0392	1.0563	1.0661	1.0706
20	1	0.25	1.5285	10.7743	0.7620	0.9332	0.9828	1.0080	1.0218	1.0322	1.0490	1.0587	1.0628
20	1	0.5	1.5127	1.0658	0.7542	0.9229	0.9723	0.9976	1.0111	1.0211	1.0376	1.0476	1.0512
20	1	0.75	1.4927	1.0517	0.7438	0.9109	0.9595	0.9843	0.9975	1.0086	1.0238	1.0343	1.0374
20	1	1	1.4679	1.0339	0.7319	0.8958	0.9439	0.9678	0.9812	0.9914	1.0075	1.0166	1.0203
20	5	0	7.4634	5.2587	3.7191	4.5545	4.7975	4.9213	4.9873	5.0427	5.1190	5.1716	5.1871
20	5	0.25	7.6427	5.3871	3.8101	4.6659	4.9137	5.0401	5.1091	5.1608	5.2451	5.2936	5.3141
20	5	0.5	7.5634	5.3290	3.7710	4.6143	4.8614	4.9882	5.0553	5.1056	5.1879	5.2382	5.2561
20	5	0.75	7.4634	5.2587	3.7191	4.5545	4.7975	4.9213	4.9873	5.0427	5.1190	5.1716	5.1871
20	5	1	7.3394	5.1697	3.6593	4.4791	4.7197	4.8391	4.9060	4.9570	5.0377	5.0832	5.1013
20	10	0	15.3926	10.8453	7.6743	9.3931	9.8933	10.1505	10.2898	10.3919	10.5632	10.6609	10.7057
20	10	0.25	15.2854	10.7743	7.6202	9.3318	0.8275	10.0802	10.2182	10.3216	10.4901	10.5872	10.6283
20	10	0.5	15.1268	10.6580	7.5420	9.2285	9.7228	9.9764	10.1106	10.2112	10.3758	10.4764	10.5122
20	10	0.75	14.9269	10.5173	7.4383	9.1091	9.5951	9.8425	9.9745	10.0855	10.2380	10.3432	10.3742
20	10	1	14.6788	10.3393	7.3186	8.9582	9.4393	9.6782	9.8121	9.9139	10.0753	10.1663	10.2027
20	20	0	30.7852	21.6907	15.3486	18.7862	19.7866	20.3011	20.5796	20.7839	21.1263	21.3219	21.4114
20	20	0.25	30.5708	21.5485	15.2403	18.6636	19.6550	20.1604	20.4364	20.6432	20.9802	21.1744	21.2565
20	20	0.5	30.2536	21.3159	15.0841	18.4571	19.4457	19.9529	20.2212	20.4224	20.7515	20.9528	21.0244
20	20	0.75	29.8537	21.0346	14.8765	18.2181	19.1901	19.6850	19.9491	20.1710	20.4760	20.6863	20.7483
20	20	1	29.3575	20.6787	14.6373	17.9163	18.8787	19.3563	19.6242	19.8278	20.1507	20.3326	20.4054

Table 5.15 (Cont.): Average interval length of mean for Crack distribution n = 100 (Percentile)

λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
					k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
20	50	0	76.9631	54.2267	38.3716	46.9656	49.4664	50.7527	51.4489	51.9597	52.8158	53.3047	53.5284
20	50	0.25	76.4269	53.8713	38.1008	46.6589	49.1374	50.4010	51.0910	51.6081	52.4505	52.9361	53.1412
20	50	0.5	75.6339	53.2898	37.7102	46.1426	48.6142	49.8822	50.5530	51.0560	51.8788	52.3821	52.5611
20	50	0.75	76.6343	52.5866	37.1913	45.5452	47.9753	49.2125	49.8727	50.4274	51.1900	51.7158	51.8708
20	50	1	73.3938	51.6967	36.5932	44.7908	47.1967	48.3909	49.0604	49.5695	50.3767	50.8315	51.0134
50	1	0	2.3668	1.6672	1.1802	1.4438	1.5218	1.5600	1.5820	1.5978	1.6246	1.6386	1.6448
50	1	0.25	2.3596	1.6626	1.1769	1.4400	1.5175	1.5554	1.5768	1.5924	1.6192	1.6345	1.6400
50	1	0.5	2.3491	1.6550	1.1713	1.4328	1.5106	1.5494	1.5698	1.5861	1.6120	1.6265	1.6332
50	1	0.75	2.3362	1.6456	1.1650	1.4249	1.5034	1.5403	1.5616	1.5776	1.6037	1.6179	1.6236
50	1	1	2.3204	1.6346	1.1572	1.4157	1.4928	1.5297	1.5506	1.5663	1.5934	1.6071	1.6133
50	5	0	11.8340	8.3359	5.9005	7.2192	7.6091	7.7999	7.9102	7.9889	8.1229	8.1928	8.2240
50	5	0.25	11.7978	8.3129	5.8844	7.2001	7.5873	7.7769	7.8842	7.9618	8.0961	8.1725	8.1999
50	5	0.5	11.7454	8.2752	5.8564	7.1642	7.5530	7.7472	7.8490	7.9307	8.0601	8.1323	8.1657
50	5	0.75	11.6810	8.2280	5.8249	7.1242	7.5168	7.7015	7.8081	7.8881	8.0182	8.0893	8.1181
50	5	1	11.6020	8.1731	5.7862	7.0787	7.4641	7.6482	7.7532	7.8315	7.9668	8.0355	8.0663
50	10	0	23.6680	16.6718	11.8017	14.4384	15.2182	15.5998	15.8204	15.9778	16.2458	16.3856	16.4481
50	10	0.25	23.5956	16.6259	11.7689	14.4001	15.1745	15.5539	15.7684	15.9236	16.1922	16.3449	16.3998
50	10	0.5	23.4909	16.5503	11.7129	14.3284	15.1059	15.4943	15.6979	15.8615	16.1201	16.2645	16.3315
50	10	0.75	23.3619	16.4559	11.6498	14.2485	15.0335	15.4029	15.6162	15.7762	16.0365	16.1787	16.2361
50	10	1	23.2040	16.3462	11.5724	14.1574	14.9281	15.2965	15.5063	15.6630	15.9336	16.0710	16.1325
50	20	0	47.3360	33.3436	23.6034	28.8768	30.4364	31.1996	31.6408	31.9553	32.4916	32.7711	32.8961
50	20	0.25	47.1912	33.2517	23.5377	28.8003	30.3490	31.1077	31.5368	31.8472	32.3844	32.6899	32.8997
50	20	0.5	46.9818	33.1007	23.4258	28.6568	30.2119	30.9886	31.3958	31.7229	32.2403	32.5291	32.6629
50	20	0.75	46.7238	32.9119	23.2996	28.4970	30.0671	30.8058	31.2325	31.5524	32.0729	32.3573	32.4722
50	20	1	46.4080	32.6923	23.1449	28.3147	29.8562	30.5930	31.0127	31.3260	31.8672	32.1421	32.2650
50	50	0	118.3399	83.3590	59.0084	72.1921	76.0910	77.9991	79.1019	79.8891	81.2290	81.9278	82.2403
50	50	0.25	117.9780	83.1294	58.8444	72.0006	75.8726	77.7692	78.8419	79.6179	80.9611	81.7247	81.9991
50	50	0.5	117.4544	82.7517	58.5644	71.6420	75.5297	77.4715	78.4896	79.3072	80.6007	81.3227	81.6574
50	50	0.75	116.8095	82.2796	58.2490	71.2424	75.1677	77.0145	78.0881	78.8809	80.1824	80.8933	81.1805
50	50	1	116.0201	81.7308	57.8622	70.7868	74.6405	76.4824	77.5316	78.3149	79.6680	80.3552	80.6625

Table 5.16: Average interval length of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	2	1	0	2.0136	1.3830	1.2597	1.3356	1.3580	1.3621	1.3669	1.3713	1.3778	1.3818	1.3826
	2	1	0.25	1.9360	1.3282	1.2109	1.2828	1.3059	1.3096	1.3141	1.3185	1.3244	1.3283	1.3288
	2	1	0.5	1.8065	1.2398	1.1283	1.1964	1.2179	1.2213	1.2268	1.2299	1.2351	1.2391	1.2400
	2	1	0.75	1.6385	1.1246	1.0214	1.0854	1.1033	1.1069	1.1124	1.1141	1.1197	1.1238	1.1234
	2	1	1	1.4019	0.9613	0.8748	0.9291	0.9443	0.9478	0.9523	0.9532	0.9579	0.9608	0.9612
	2	5	0	10.0677	6.9149	6.2985	6.6778	6.7901	6.8107	6.8346	6.8567	6.8892	6.9091	6.9128
	2	5	0.25	9.6798	6.6412	6.0543	6.4141	6.5295	6.5481	6.5704	6.5925	6.6218	6.6413	6.6441
	2	5	0.5	9.0325	6.1990	5.6414	5.9821	6.0895	6.1066	6.1341	6.1497	6.1454	6.1956	6.2001
	2	5	0.75	8.1925	5.6231	5.1069	5.4271	5.5164	5.5344	5.5620	5.5705	5.5987	5.6189	5.6171
	2	5	1	7.0097	4.8063	4.3739	4.6454	4.7217	4.7388	4.7616	4.7659	4.7893	4.8042	4.8060
	2	10	0	20.1355	13.8298	12.5970	13.3556	13.5803	13.6214	13.6693	13.7134	13.7783	13.8181	13.8255
	2	10	0.25	19.3595	13.2824	12.1086	12.8282	13.0589	13.0963	13.1408	13.1849	13.2435	13.2826	13.2881
	2	10	0.5	18.0650	12.3979	11.2829	11.9642	12.1791	12.2131	12.2681	12.2994	12.3508	12.3911	12.4002
	2	10	0.75	16.3850	11.2463	10.2137	10.8542	11.0327	11.0681	11.1240	11.1410	11.1974	11.2378	11.2342
	2	10	1	14.0193	9.6126	8.7479	9.2908	9.4434	9.4777	9.5231	9.5318	9.5786	9.6084	9.6121
	2	20	0	40.2709	27.6596	25.1940	26.7112	27.1605	27.2429	27.3386	27.4268	27.5566	27.6363	27.6511
	2	20	0.25	38.7191	26.5649	24.2172	25.6563	26.1179	26.1926	26.2816	26.3698	26.4870	26.5653	26.5762
	2	20	0.5	36.1300	24.7959	22.5657	23.9285	24.3582	24.4262	24.5362	24.5988	24.7015	24.7822	24.8004
	2	20	0.75	32.7702	22.4925	20.4274	21.7084	22.0655	22.1376	22.2480	22.2819	22.3949	22.4756	22.4683
	2	20	1	28.0387	19.2251	17.4957	18.5816	18.8868	18.9553	19.0462	19.0636	19.1572	19.2168	19.2241
	2	50	0	100.6773	69.1489	62.9851	66.7780	67.9013	68.1071	68.3465	68.5669	68.8915	69.0907	69.1276
	2	50	0.25	96.7977	66.4121	60.5431	64.1408	65.2947	65.4814	65.7040	65.9246	66.2175	66.4131	66.4405
	2	50	0.5	90.3250	61.9896	56.4143	59.8212	60.8954	61.0655	61.3405	61.4969	61.7538	61.9555	62.0011
	2	50	0.75	81.9254	56.2314	51.0686	54.2710	55.1637	55.3439	55.6199	55.7049	55.9872	56.1889	56.1708
	2	50	1	70.0966	48.0628	43.7393	46.4540	47.2169	47.3883	47.6155	47.6590	47.8930	48.0420	48.0603
	5	1	0	2.6804	1.8435	1.6854	1.7781	1.8097	1.8149	1.8213	1.8256	1.8357	1.8413	1.8415
	5	1	0.25	2.6220	1.8020	1.6486	1.7388	1.7698	1.7752	1.7811	1.7857	1.7955	1.8003	1.8015
	5	1	0.5	2.5231	1.7337	1.5850	1.6734	1.7022	1.7086	1.7158	1.7176	1.7273	1.7324	1.7327
	5	1	0.75	2.4014	1.6506	1.5088	1.5944	1.6192	1.6253	1.6338	1.6341	1.6437	1.6495	1.6493
	5	1	1	2.2443	1.5422	1.4107	1.4895	1.5135	1.5198	1.5264	1.5270	1.5363	1.5404	1.5424

Table 5.16 (Cont.): Average interval length of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	5	5	0	13.4022	9.2175	8.4269	8.8903	9.0486	9.0743	9.1066	9.1280	9.1782	9.2067	9.2073
	5	5	0.25	13.1098	9.0102	8.2428	8.6938	8.8488	8.8758	8.9057	8.9287	8.9777	9.0014	9.0075
	5	5	0.5	12.6154	8.6684	7.9248	8.3672	8.5111	8.5429	8.5792	8.5882	8.6364	8.6622	8.6636
	5	5	0.75	12.0069	8.2531	7.5438	7.9721	8.0960	8.1266	8.1691	8.1707	8.2183	8.2475	8.2467
	5	5	1	11.2217	7.7108	7.0533	7.4473	7.5673	7.5988	7.6319	7.6352	7.6816	7.7022	7.7118
	5	10	0	26.8044	18.4351	16.8538	17.7806	18.0972	18.1486	18.2132	18.2560	18.3565	18.4133	18.4146
	5	10	0.25	26.2195	18.0204	16.4856	17.3876	17.6976	17.7516	17.8113	17.8575	17.9545	18.0028	18.0150
	5	10	0.5	25.2308	17.3367	15.8496	16.7344	17.0223	17.0858	17.1583	17.1764	17.2728	17.3244	17.3272
	5	10	0.75	24.0138	16.5061	15.0875	15.9441	16.1919	16.2531	16.3382	16.3414	16.4366	16.4949	16.4933
	5	10	1	22.4434	15.4216	14.1065	14.8947	15.1345	15.1976	15.2637	15.2704	15.3633	15.4044	15.4235
	5	20	0	53.6089	36.8702	33.7076	35.5612	36.1944	36.2971	36.4263	36.5121	36.7130	36.8267	36.8292
	5	20	0.25	52.4390	36.0407	32.9713	34.7752	35.3951	35.5033	35.6226	35.7149	35.9090	36.0056	36.0301
	5	20	0.5	50.4616	34.6735	31.6991	33.4688	34.0446	34.1715	34.3167	34.3527	34.5455	34.6489	34.6545
	5	20	0.75	48.0277	33.0123	30.1751	31.8883	32.3838	32.5062	32.6764	32.6828	32.8731	32.9898	32.9867
	5	20	1	44.8869	30.8431	28.2130	29.7893	30.2690	30.3952	30.5274	30.5407	30.7265	30.8087	30.8471
	5	50	0	134.0221	92.1754	84.2691	88.9029	90.4861	90.7428	91.0658	91.2802	91.7825	92.0667	92.0729
	5	50	0.25	131.0975	90.1018	82.4281	86.9379	88.4878	88.7582	89.0566	89.2873	89.7725	90.0139	90.0752
0.75	5	50	0.5	126.1539	86.6837	79.2477	83.6720	85.1114	85.4288	85.7917	85.8817	86.3639	86.6222	86.6361
	5	50	0.75	120.0692	82.5306	75.4377	79.7207	80.9595	81.2655	81.6911	81.7071	82.1828	82.4745	82.4667
	5	50	1	112.2171	77.1078	70.5326	74.4733	75.6725	75.9881	76.3185	76.3518	76.8163	77.0218	77.1177
	10	1	0	3.5211	2.4199	2.2207	2.3365	2.3777	2.3865	2.3963	2.4000	2.4141	2.4213	2.4204
	10	1	0.25	3.4749	2.3881	2.1916	2.3046	2.3463	2.3547	2.3640	2.3699	2.3829	2.3879	2.3880
	10	1	0.5	3.4007	2.3367	2.1438	2.2561	2.2955	2.3039	2.3138	2.3179	2.3321	2.3374	2.3369
	10	1	0.75	3.3089	2.2737	2.0860	2.1956	2.2336	2.2432	2.2517	2.2541	2.2684	2.2744	2.2746
	10	1	1	3.1954	2.1948	2.0141	2.1203	2.1582	2.1662	2.1746	2.1765	2.1903	2.1961	2.1974
	10	5	0	17.6055	12.0997	11.1035	11.6826	11.8882	11.9325	11.9813	12.0002	12.0704	12.1062	12.1020
	10	5	0.25	17.3744	11.9404	10.9581	11.5228	11.7315	11.7737	11.8202	11.8496	11.9142	11.9395	11.9399
	10	5	0.5	17.0033	11.6835	10.7192	11.2807	11.4777	11.5196	11.5688	11.5896	11.6604	11.6871	11.6845
	10	5	0.75	16.5443	11.3686	10.4301	10.9777	11.1681	11.2160	11.2586	11.2703	11.3421	11.3722	11.3732
	10	5	1	15.9769	10.9741	10.0705	10.6013	10.7911	10.8308	10.8730	10.8825	10.9512	10.9807	10.9869
	10	10	0	35.2110	24.1994	22.2070	23.3652	23.7765	23.8650	23.9626	24.0004	24.1407	24.2125	24.2040
	10	10	0.25	34.7488	23.8809	21.9162	23.0457	23.4630	23.5473	23.6404	23.6993	23.8285	23.8791	23.8798
	10	10	0.5	34.0067	23.3670	21.4384	22.5614	22.9554	23.0392	23.1375	23.1792	23.3208	23.3742	23.3690
	10	10	0.75	33.0885	22.7372	20.8601	21.9555	22.3362	22.4320	22.5171	22.5407	22.6843	22.7444	22.7464
	10	10	1	31.9537	21.9482	20.1409	21.2026	21.5821	21.6616	21.7459	21.7651	21.9025	21.9614	21.9738

Table 5.16 (Cont.): Average interval length of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	10	20	0	70.4220	48.3989	44.4140	46.7304	47.5530	47.7299	47.9253	48.0008	48.2814	48.4249	48.4079
	10	20	0.25	69.4976	47.7618	43.8324	46.0914	46.9259	47.0946	47.2809	47.3986	47.6570	47.7582	47.7595
	10	20	0.5	68.0134	46.7341	42.8768	45.1229	45.9108	46.0784	46.2750	46.3584	46.6416	46.7484	46.7379
	10	20	0.75	66.1770	45.4744	41.7203	43.9109	44.6724	44.8639	45.0342	45.0814	45.3686	45.4887	45.4927
	10	20	1	63.9074	43.8964	40.2819	42.4052	43.1643	43.3231	43.4918	43.5301	43.8050	43.9228	43.9476
	10	50	0	176.0550	120.9972	111.0350	116.8260	118.8824	119.3247	119.8131	120.0020	120.7036	121.0623	121.0197
	10	50	0.25	173.7440	119.4044	109.5809	115.2284	117.3148	117.7366	118.2022	118.4965	119.1424	119.3954	119.3989
	10	50	0.5	170.0334	116.8352	107.1920	112.8072	114.7769	115.1959	115.6876	115.8959	116.6041	116.8711	116.8448
	10	50	0.75	165.4425	113.6860	104.3007	109.7773	111.6810	112.1599	112.5855	112.7034	113.4214	113.7218	113.7319
	10	50	1	159.7685	109.7409	100.7046	106.0131	107.9107	108.3078	108.7295	108.8253	109.5124	109.8069	109.8691
	20	1	0	4.7819	3.2874	3.0185	3.1754	3.2313	3.2408	3.2550	3.2594	3.2783	3.2872	3.2903
	20	1	0.25	4.7448	3.2605	2.9964	3.1488	3.2063	3.2154	3.2287	3.2342	3.2539	3.2617	3.2631
	20	1	0.5	4.6879	3.2223	2.9603	3.1116	3.1666	3.1772	3.1915	3.1939	3.2150	3.2222	3.2246
	20	1	0.75	4.6222	3.1778	2.9185	3.0697	3.1210	3.1331	3.1456	3.1478	3.1697	3.1769	3.1783
	20	1	1	4.5413	3.1212	2.8676	3.0152	3.0691	3.0792	3.0905	3.0930	3.1137	3.1201	3.1229
	20	5	0	23.9094	16.4369	15.0924	15.8770	16.1566	16.2040	16.2752	16.2970	16.3917	16.4360	16.4513
	20	5	0.25	23.7240	16.3026	14.9820	15.7440	16.0313	16.0771	16.1437	16.1709	16.2693	16.3084	16.3153
	20	5	0.5	23.4397	16.1114	14.8014	15.5579	15.8328	15.8861	15.9576	15.9693	16.0751	16.1111	16.1230
	20	5	0.75	23.1111	15.8892	14.5924	15.3485	15.6048	15.6657	15.7282	15.7391	15.8483	15.8844	15.8914
	20	5	1	22.7063	15.6058	14.3379	15.0762	15.3457	15.3962	15.4524	15.4652	15.5685	15.6005	15.6145
	20	10	0	47.8187	32.8739	30.1849	31.7541	32.3131	32.4081	32.5503	32.5940	32.7834	32.8719	32.9026
	20	10	0.25	47.4480	32.6051	29.9641	31.4881	32.0625	32.1543	32.2873	32.3417	32.5385	32.6167	32.6307
	20	10	0.5	46.8794	32.2227	29.6027	31.1157	31.6655	31.7721	31.9153	31.9385	32.1501	32.2222	32.2460
	20	10	0.75	46.2223	31.7783	29.1849	30.6971	31.2097	31.3314	31.4564	31.4782	31.6966	31.7687	31.7828
	20	10	1	45.4126	31.2117	28.6758	30.1524	30.6914	30.7923	30.9048	30.9304	31.1370	31.2010	31.2289
	20	20	0	95.6375	65.7477	60.3697	63.5082	64.6262	64.8161	65.1006	65.1880	65.5668	65.7439	65.8052
	20	20	0.25	94.8960	65.2103	59.9282	62.9762	64.1251	64.3086	64.5747	64.6834	65.0771	65.2334	65.2613
	20	20	0.5	93.7589	64.4454	59.2055	62.2315	63.3310	63.5442	63.8306	63.8770	64.3002	64.4444	64.4919
	20	20	0.75	92.4446	63.5567	58.3698	61.3941	62.4193	62.6628	62.9127	62.9565	63.3933	63.5375	63.5657
	20	20	1	90.8252	62.4234	57.3515	60.3048	61.3828	61.5846	61.8096	61.8608	62.2741	62.4019	62.4578

Table 5.16 (Cont.): Average interval length of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	20	50	0	239.0936	164.3693	150.9243	158.7704	161.5655	162.0403	162.7515	162.9699	163.9170	164.3597	164.5129
	20	50	0.25	237.2399	163.0256	149.8204	157.4404	160.3127	160.7714	161.4367	161.7086	162.6927	163.0835	163.1533
	20	50	0.5	234.3972	161.1135	148.0137	155.5787	158.3275	158.8605	159.5764	159.6925	160.7506	161.1109	161.2298
	20	50	0.75	231.1114	158.8917	145.9244	153.4853	156.0483	156.6570	157.2819	157.3912	158.4832	158.8437	158.9141
	20	50	1	227.0630	156.0584	143.3788	150.7619	153.4569	153.9616	154.5239	154.6520	155.6851	156.0048	156.1445
	50	1	0	7.3554	5.0563	4.6444	4.8821	4.9723	4.9868	5.0062	5.0122	5.0426	5.0540	5.0626
	50	1	0.25	7.3283	5.0359	4.6278	4.8644	4.9534	4.9672	4.9893	4.9938	5.0248	5.0357	5.0425
	50	1	0.5	7.2900	5.0114	4.6032	4.8379	4.9259	4.9435	4.9631	4.9655	4.9993	5.0099	5.0161
	50	1	0.75	7.2476	4.9829	4.5794	4.8140	4.8964	4.9130	4.9330	4.9371	4.9697	4.9803	4.9874
	50	1	1	7.1964	4.9471	4.5485	4.7791	4.8649	4.8798	4.8997	4.9004	4.9339	4.9468	4.9525
	50	5	0	36.7771	25.2817	23.2217	24.4103	24.8614	24.9342	25.0308	25.0612	25.2131	25.2700	25.3128
	50	5	0.25	36.6415	25.1794	23.1390	24.3218	24.7670	24.8358	24.9463	24.9689	25.1239	25.1783	25.2124
	50	5	0.5	36.4500	25.0570	23.0159	24.1897	24.6296	24.7175	24.8155	24.8276	24.9965	25.0495	25.0805
	50	5	0.75	36.2382	24.9145	22.8969	24.0698	24.4817	24.5649	24.6647	24.6855	24.8486	24.9013	24.9369
	50	5	1	35.9818	24.7354	22.7426	23.8955	24.3247	24.3989	24.4985	24.5019	24.6694	24.7340	24.7626
	50	10	0	73.5542	50.5633	46.4435	48.8207	49.7227	49.8684	50.0616	50.1223	50.4262	50.5400	50.6256
	50	10	0.25	73.2829	50.3587	46.2779	48.6436	49.5340	49.6716	49.8925	49.9377	50.2479	50.3565	50.4249
	50	10	0.5	72.8999	50.1140	46.0318	48.3794	49.2592	49.4349	49.6311	49.6553	49.9930	50.0991	50.1609
	50	10	0.75	72.4764	49.8290	45.7937	48.1396	48.9635	49.1297	49.3295	49.3710	49.6971	49.8025	49.8738
	50	10	1	71.9636	49.4707	45.4852	47.7910	48.6494	48.7979	48.9970	49.0039	49.3387	49.4679	49.5252
	50	20	0	147.1083	101.1267	92.8869	97.6414	99.4455	99.7369	100.1233	100.2446	100.8523	101.0800	101.2511
	50	20	0.25	146.5658	100.7175	92.5558	97.2872	99.0681	99.3432	99.7851	99.8754	100.4957	100.7131	100.8497
	50	20	0.5	145.7998	100.2281	92.0637	96.7589	98.5184	98.8699	99.2621	99.3105	99.9861	100.1982	100.3219
	50	20	0.75	144.9528	99.6581	91.5875	96.2793	97.9269	98.2595	98.6590	98.7420	99.3942	99.6050	99.7477
	50	20	1	143.9272	98.9415	90.9704	95.5820	97.2988	97.5957	97.9941	98.0078	98.6774	98.9358	99.0503
	50	50	0	367.7707	252.8167	232.2173	244.1034	248.6136	249.3421	250.3081	250.6115	252.1307	252.7000	253.1278
	50	50	0.25	366.4145	251.7936	231.3896	243.2180	247.6702	248.3580	249.4627	249.6885	251.2393	251.7826	252.1243
	50	50	0.5	364.4995	250.5702	230.1592	241.8972	246.2960	247.1747	248.1553	248.2763	249.9652	250.4954	250.8047
	50	50	0.75	362.3819	249.1451	228.9686	240.6981	244.8173	245.6487	246.6474	246.8549	248.4856	249.0126	249.3692
	50	50	1	359.8179	247.3536	227.4259	238.9549	243.2470	243.9893	244.9851	245.0194	246.6935	247.3395	247.6258

Table 5.16 (Cont.): Average interval length of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	2	1	0	2.0136	1.3830	1.2942	1.6544	1.3668	1.3707	1.3752	1.3755	1.3819	1.3860	1.3865
	2	1	0.25	1.9360	1.3282	1.2437	1.3011	1.3145	1.3177	1.3222	1.3225	1.3284	1.3322	1.3327
	2	1	0.5	1.8065	1.2398	1.1585	1.2133	1.2257	1.2290	1.2344	1.2337	1.2389	1.2427	1.2437
	2	1	0.75	1.6385	1.1246	1.0488	1.1005	1.1104	1.1139	1.1194	1.1177	1.1232	1.1271	1.1268
	2	1	1	1.4019	0.9613	0.8980	0.9423	0.9505	0.9536	0.9582	0.9561	0.9607	0.9637	0.9641
	2	5	0	10.0677	6.9149	6.4708	6.7719	6.8338	6.8534	6.8761	6.8775	6.9095	6.9301	6.9325
	2	5	0.25	9.6798	6.6412	6.2185	6.5054	6.5727	6.5885	6.6109	6.6123	6.6422	6.6610	6.6635
	2	5	0.5	9.0325	6.1990	5.7925	6.0666	6.1285	6.1447	6.1717	6.1684	6.1946	6.2135	6.2183
	2	5	0.75	8.1925	5.6231	5.2440	5.5027	5.5521	5.5692	5.5969	5.5884	5.6160	5.6355	5.6339
	2	5	1	7.0097	4.8063	4.4902	4.7117	4.7524	4.7682	4.7908	4.7806	4.8035	4.8185	4.8206
	2	10	0	20.1355	13.8298	12.9416	13.5438	13.6676	13.7068	13.7522	13.7549	13.8190	13.8601	13.8650
	2	10	0.25	19.3595	13.2824	12.4371	13.0107	13.1454	13.1771	13.2217	13.2247	13.2843	13.3220	13.3270
0.85	2	10	0.5	18.0650	12.3979	11.5850	12.1333	12.2569	12.2895	12.3435	12.3369	12.3892	12.4270	12.4367
	2	10	0.75	16.3851	11.2463	10.4880	11.0054	11.1042	11.1385	11.1938	11.1769	11.2320	11.2709	11.2678
	2	10	1	14.0193	9.6126	8.9803	9.4234	9.5048	9.5364	9.5816	9.5611	9.6070	9.6370	9.6412
	2	20	0	40.2709	27.6596	25.8833	27.0876	27.3352	27.4137	27.5044	27.5099	27.6381	27.7202	27.7300
	2	20	0.25	38.7191	26.5649	24.8741	26.0214	26.2909	26.3541	26.4435	26.4494	26.5686	26.6441	26.6541
	2	20	0.5	36.1300	24.7959	23.1699	24.2666	24.5138	24.5790	24.6869	24.6737	24.7784	24.8540	24.8733
	2	20	0.75	32.7702	22.4925	20.9760	22.0108	22.2083	22.2770	22.3876	22.3537	22.4640	22.5419	22.5355
	2	20	1	28.0387	19.2251	17.9606	18.8468	19.0095	19.0728	19.1632	19.1223	19.2140	19.2740	19.2823
	2	50	0	100.6773	69.1489	64.7082	67.7189	68.3379	68.5342	68.7609	68.7747	69.0952	69.3006	69.3251
	2	50	0.25	96.7977	66.4121	62.1853	65.0535	65.7272	65.8853	66.1087	66.1234	66.4215	66.6101	66.6352
	2	50	0.5	90.3250	61.9896	57.9248	60.6666	61.2845	61.4474	61.7173	61.6843	61.9460	62.1349	62.1833
	2	50	0.75	81.9254	56.2314	52.4399	55.0270	55.5209	55.6924	55.9689	55.8843	56.1600	56.3547	56.3388
	2	50	1	70.0966	48.0628	44.9016	47.1171	47.5237	47.6821	47.9080	47.8057	48.0350	48.1850	48.2058

Table 5.16 (Cont.): Average interval length of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.85	5	1	0	2.6804	1.8435	1.7314	1.8037	1.8220	1.8266	1.8327	1.8313	1.8412	1.8468	1.8468
	5	1	0.25	2.6220	1.8020	1.6939	1.7635	1.7813	1.7863	1.7926	1.7912	1.8010	1.8055	1.8068
	5	1	0.5	2.5231	1.7337	1.6296	1.6976	1.7137	1.7191	1.7266	1.7228	1.7326	1.7377	1.7380
	5	1	0.75	2.4014	1.6506	1.5505	1.6171	1.6300	1.6358	1.6439	1.6394	1.6486	1.6544	1.6541
	5	1	1	2.2443	1.5422	1.4495	1.5105	1.5234	1.5294	1.5358	1.5317	1.5410	1.5450	1.5468
	5	5	0	13.4022	9.2175	8.6569	9.0186	9.1101	9.1328	9.1633	9.1565	9.2060	9.2342	9.2341
	5	5	0.25	13.1098	9.0102	8.4696	8.8174	8.9063	8.9316	8.9627	8.9560	9.0048	9.0277	9.0339
	5	5	0.5	12.6154	8.6684	8.1481	8.4878	8.5684	8.5957	8.6331	8.6139	8.6629	8.6884	8.6897
	5	5	0.75	12.0069	8.2531	7.7523	8.0855	8.1502	8.1789	8.2197	8.1968	8.2430	8.2722	8.2704
	5	5	1	11.2217	7.7108	7.2475	7.5525	7.6171	7.6470	7.6789	7.6584	7.7048	7.7249	7.7338
	5	10	0	26.8044	18.4351	17.3138	18.0372	18.2201	18.2655	18.3267	18.3130	18.4119	18.4684	18.4681
	5	10	0.25	26.2195	18.0204	16.9392	17.6349	17.8126	17.8632	17.9255	17.9120	18.0095	18.0554	18.0678
	5	10	0.5	25.2308	17.3367	16.2962	16.9756	17.1368	17.1914	17.2663	17.2278	17.3257	17.3768	17.3795
	5	10	0.75	24.0138	16.5061	15.5045	16.1710	16.3004	16.3578	16.4394	16.3936	16.4860	16.5444	16.5408
	5	10	1	22.4434	15.4216	14.4951	15.1049	15.2343	15.2941	15.3577	15.3168	15.4095	15.4498	15.4677
	5	20	0	53.6089	36.8702	34.6276	36.0743	36.4402	36.5311	36.6533	36.6261	36.8238	36.9368	36.9363
	5	20	0.25	52.4390	36.0407	33.8783	35.2697	35.6253	35.7263	35.7509	35.8240	36.0190	36.1107	36.1356
	5	20	0.5	50.4616	34.6735	32.5923	33.9512	34.2736	34.3827	34.5325	34.4557	34.6514	34.7535	34.7589
	5	20	0.75	48.0277	33.0123	31.0090	32.3420	32.6008	32.7155	32.8788	32.7873	32.9721	33.0888	33.0815
	5	20	1	44.8869	30.8431	28.9902	30.2098	30.4685	30.5882	30.7155	30.6335	30.8190	30.8997	30.9354
	5	50	0	134.0221	92.1754	86.5690	90.1858	91.1005	91.3277	91.6333	91.5652	92.0595	92.3420	92.3406
	5	50	0.25	131.0975	90.1018	84.6958	88.1743	89.0632	89.3158	89.6273	89.5599	90.0475	90.2767	90.3389
	5	50	0.5	126.1539	86.6837	81.4808	84.8781	85.6839	85.9569	86.3313	86.1392	86.6285	86.8838	86.8973
	5	50	0.75	120.0692	82.5306	77.5225	80.8550	81.5019	81.7887	82.1969	81.9682	82.4302	82.7221	82.7038
	5	50	1	112.2171	77.1078	72.4755	75.5246	76.1713	76.4704	76.7887	76.5838	77.0475	77.2492	77.3384
	10	1	0	3.5211	2.4199	2.2820	2.3702	2.3936	2.4020	2.4113	2.4073	2.4213	2.4284	2.4275
	10	1	0.25	3.4749	2.3881	2.2529	2.3378	2.3616	2.3701	2.3789	2.3773	2.3904	2.3952	2.3949
	10	1	0.5	3.4007	2.3367	2.2047	2.2887	2.3111	2.3190	2.3283	2.3252	2.3393	2.3446	2.3441
	10	1	0.75	3.3089	2.2737	2.1438	2.2273	2.2484	2.2573	2.2659	2.2611	2.2754	2.2811	2.2812
	10	1	1	3.1954	2.1948	2.0707	2.1513	2.1726	2.1800	2.1885	2.1831	2.1969	2.2025	2.2040
	10	5	0	17.6055	12.0997	11.4099	11.8512	11.9681	12.0098	12.0566	12.0365	12.1067	12.1420	12.1375
	10	5	0.25	17.3744	11.9404	11.2645	11.6892	11.8081	11.8504	11.8944	11.8864	11.9521	11.9758	11.9746
	10	5	0.5	17.0033	11.6835	11.0232	11.4434	11.5553	11.5950	11.6413	11.6258	11.6967	11.7227	11.7205
	10	5	0.75	16.5443	11.3686	10.7189	11.1366	11.2419	11.2867	11.3293	11.3057	11.3772	11.4056	11.4062
	10	5	1	15.9769	10.9741	10.3535	10.7566	10.8629	10.9002	10.9427	10.9153	10.9847	11.0122	11.0199

Table 5.16 (Cont.): Average interval length of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	10	10	0	35.2110	24.1994	22.8198	23.7024	23.9363	24.0196	24.1132	24.0731	24.2134	24.2840	24.2749
	10	10	0.25	34.7488	23.8809	22.5290	23.3784	23.6162	23.7008	23.7888	23.7727	23.9041	23.9516	23.9491
	10	10	0.5	34.0067	23.3670	22.0463	22.8868	23.1106	23.7899	23.2825	23.2517	23.3933	23.4455	23.4410
	10	10	0.75	33.0885	22.7372	21.4378	22.2732	22.4838	22.5733	22.6586	22.6113	22.7544	22.8112	22.8123
	10	10	1	31.9537	21.9482	20.7071	21.5131	21.7257	21.8004	21.8853	21.8305	21.9694	22.0245	22.0397
	10	20	0	70.4220	48.3989	45.6397	47.4049	47.8726	48.0392	48.2265	48.1462	48.4268	48.5680	48.5499
	10	20	0.25	69.4976	47.7618	45.0581	46.7567	47.2324	47.4015	47.5776	47.5455	47.8083	47.9032	47.8983
	10	20	0.5	68.0134	46.7341	44.0926	45.7735	46.2212	46.3798	46.5651	46.5034	46.7867	46.8910	46.8820
	10	20	0.75	66.1770	45.4744	42.8757	44.5465	44.9676	45.1466	45.3172	45.2226	45.5087	45.6225	45.6246
	10	20	1	63.9074	43.8964	41.4141	43.0263	43.4515	43.6008	43.7706	43.6611	43.9387	44.0489	44.0795
	10	50	0	176.0550	120.9972	114.0991	118.5122	119.6814	120.0981	120.5662	120.3655	121.0669	121.4199	121.3747
	10	50	0.25	173.7440	119.4044	112.6452	116.8919	118.0809	118.5038	118.9441	118.8636	119.5206	119.7579	119.7457
	10	50	0.5	170.0334	116.8352	110.2315	114.4338	115.5529	115.9496	116.4127	116.2584	116.9667	117.2274	117.2049
	10	50	0.75	165.4425	113.6860	107.1892	111.3662	112.4191	112.8665	113.2930	113.0565	113.7717	114.0562	114.0615
	10	50	1	159.7685	109.7409	103.5352	107.5657	108.6287	109.0020	109.4266	109.1527	109.8468	110.1223	110.1987
	20	1	0	4.7819	3.2874	3.1031	3.2210	3.2529	3.2614	3.2755	3.2692	3.2885	3.2971	3.3004
	20	1	0.25	4.7448	3.2605	3.0802	3.1943	3.2278	3.2362	3.2490	3.2442	3.2639	3.2717	3.2733
0.85	20	1	0.5	4.6879	3.2223	3.0422	3.1565	3.1876	3.1978	3.2109	3.2040	3.2249	3.2319	3.2350
	20	1	0.75	4.6222	3.1778	2.9996	3.1147	3.1418	3.1534	3.1653	3.1575	3.1790	3.1866	3.1877
	20	1	1	4.5413	3.1212	2.9485	3.0598	3.0890	3.0992	3.1095	3.1025	3.1227	3.1297	3.1323
	20	5	0	23.9094	16.4369	15.5155	16.1052	16.2645	16.3069	16.3775	16.3459	16.4425	16.4856	16.5022
	20	5	0.25	23.7240	16.3026	15.4011	15.9715	16.1388	16.1808	16.2449	16.2208	16.3193	16.3585	16.3662
	20	5	0.5	23.4397	16.1114	15.2111	15.7823	15.9378	15.9889	16.0545	16.0198	16.1245	16.1595	16.1748
	20	5	0.75	23.1111	15.8892	14.9981	15.5734	15.7090	15.7669	15.8266	15.7876	15.8949	15.9332	15.9384
	20	5	1	22.7063	15.6058	14.7423	15.2988	15.4449	15.4960	15.5475	15.5125	15.6133	15.6483	15.6613
	20	10	0	47.8187	32.8739	31.0309	32.2104	32.5291	32.6138	32.7549	32.6918	32.8850	32.9712	33.0043
	20	10	0.25	47.4480	32.6051	30.8023	31.9431	32.2776	32.3616	32.4898	32.4416	32.6387	32.7170	32.7325
	20	10	0.5	46.8794	32.2227	30.4221	31.5647	31.8756	31.9777	32.1091	32.0395	32.2490	32.3190	32.3495
	20	10	0.75	46.2223	31.7783	29.9961	31.1468	31.4180	31.5339	31.6533	31.5752	31.7899	31.8663	31.8768
	20	10	1	45.4126	31.2117	29.4846	30.5977	30.8898	30.9919	31.0951	31.0251	31.2265	31.2967	31.3225
	20	20	0	95.6375	65.7477	62.0618	64.4207	65.0581	62.2277	65.5098	65.3836	65.7700	65.9424	66.0087
	20	20	0.25	94.8960	65.2103	61.6045	63.8862	64.5552	64.7233	64.9796	64.8831	65.2773	65.4339	65.4649
	20	20	0.5	93.7589	64.4454	60.8442	63.1293	63.7512	63.9555	64.2181	64.0790	64.4981	64.6380	64.6990
	20	20	0.75	92.4446	63.5567	59.9922	62.2936	62.8359	63.0677	63.3065	63.1504	63.5797	63.7327	63.7536
	20	20	1	90.8252	62.4234	58.9691	61.1953	61.7797	61.9839	62.1902	62.0501	62.4530	62.5934	62.6450

Table 5.16 (Cont.): Average interval length of mean for Crack distribution n = 10 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.85	20	50	0	239.0936	164.3693	155.1545	161.0518	162.6453	163.0691	163.7745	163.4591	164.4250	164.8560	165.0217
	20	50	0.25	237.2399	163.0256	154.0113	159.7155	161.3881	161.8082	162.4490	162.2078	163.1933	163.5848	163.6623
	20	50	0.5	234.3972	161.1135	152.1106	157.8234	159.3780	159.8886	160.5453	160.1975	161.2452	161.5949	161.7475
	20	50	0.75	231.1114	158.8317	149.9806	155.7339	157.0898	157.6693	158.2662	157.8761	158.9493	159.3316	159.3841
	20	50	1	227.0630	156.0584	147.4228	152.9883	154.4492	154.9596	155.4754	155.1253	156.1326	156.4834	156.6125
	50	1	0	7.3554	5.0563	4.7776	4.9527	5.0057	5.0184	5.0384	5.0274	5.0578	5.0689	5.0778
	50	1	0.25	7.3283	5.0359	4.7593	4.9356	4.9866	4.9994	5.0202	5.0093	5.0403	5.0509	5.0571
	50	1	0.5	7.2900	5.0114	4.7332	4.9082	4.9589	4.9757	4.9948	4.9804	5.0143	5.0255	5.0304
	50	1	0.75	7.2476	4.9829	4.7079	4.8840	4.9290	4.9448	44.9638	4.9524	4.9853	4.9951	5.0023
	50	1	1	7.1964	4.9471	4.6463	4.8484	4.8977	4.9118	4.9306	4.9160	4.9484	4.9610	4.9679
	50	5	0	36.7771	25.2817	23.8878	24.7633	25.0283	25.0921	25.1920	25.1369	25.2892	25.3447	25.3889
	50	5	0.25	36.6415	25.1794	23.7964	24.6780	24.9329	24.9968	25.1011	25.0463	25.2015	25.2545	25.2855
	50	5	0.5	36.4500	25.0570	23.6658	24.5408	24.7943	24.8786	24.9740	24.9017	25.0717	25.1275	25.1520
	50	5	0.75	36.2382	24.9145	23.5394	24.4198	24.6449	24.7238	24.8191	24.7621	24.9263	24.9756	25.0113
	50	5	1	35.9818	24.7354	23.3814	24.2421	24.4884	24.5588	24.6530	24.5798	24.7420	24.8050	24.8396
	50	10	0	73.5542	50.5633	47.7756	49.5266	50.0566	50.1842	50.3841	50.2738	50.5784	50.6894	50.7778
	50	10	0.25	73.2829	50.3587	47.5927	49.3561	49.8657	49.9935	50.2022	50.0927	50.4031	50.5090	50.5711
	50	10	0.5	72.8999	50.1140	47.3317	49.0815	49.5886	49.7572	49.9481	4.8035	50.1434	50.2550	50.3040
	50	10	0.75	72.4764	49.8290	47.0788	48.8396	49.2898	49.4476	49.6383	49.5242	49.8525	49.9513	50.0227
	50	10	1	71.9636	49.4707	46.7628	48.4842	48.9767	49.1176	49.3059	49.1595	49.4840	49.6100	49.6791
	50	20	0	147.1083	101.1267	95.5511	99.0533	100.1132	100.3685	100.7681	100.5475	101.1567	101.3788	101.5557
	50	20	0.25	146.5658	100.7175	95.1854	98.7121	99.7314	99.9871	100.4043	100.1854	100.8061	101.0180	101.1421
	50	20	0.5	145.7998	100.2281	94.6634	98.1630	99.1772	99.5144	99.8961	99.6070	100.2868	100.5100	100.6079
	50	20	0.75	144.9528	99.6581	94.1576	97.6792	98.5797	98.8951	99.2766	99.0484	99.7050	99.9025	100.0453
	50	20	1	143.9272	98.9415	93.5256	96.9684	97.9535	98.2353	98.6118	98.3191	98.9680	99.2199	99.3583
	50	50	0	367.7707	252.8167	238.8778	247.6332	250.2829	250.9212	251.9204	251.3688	252.8918	253.4469	253.8892
	50	50	0.25	366.4145	251.7936	237.9635	246.7803	249.3285	249.9676	251.0107	250.4634	252.0154	252.5451	252.8553
	50	50	0.5	364.4995	250.5702	236.6584	245.4075	247.9430	248.7861	249.7403	249.0174	250.7169	251.2750	251.5197
	50	50	0.75	362.3819	249.1451	235.3940	244.1980	246.4492	247.2379	248.1914	247.6210	249.2626	249.7563	250.1134
	50	50	1	359.8179	247.3536	233.8140	242.4210	244.8837	245.5882	246.5295	245.7977	247.4200	248.0499	248.3956

Table 5.17: Average interval length of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	2	1	0	0.9228	0.6474	0.6020	0.6298	0.6365	0.6406	0.6417	0.6433	0.6473	0.6480	0.6497
	2	1	0.25	0.8854	0.6213	0.5781	0.6045	0.6112	0.6151	0.6156	0.6173	0.6207	0.6220	0.6232
	2	1	0.5	0.8288	0.5822	0.5412	0.5651	0.5721	0.5757	0.5765	0.5778	0.5807	0.5822	0.5834
	2	1	0.75	0.7504	0.5263	0.4896	0.5116	0.5174	0.5210	0.5220	0.5232	0.5255	0.5276	0.5280
	2	1	1	0.6494	0.4553	0.4236	0.4431	0.4479	0.4506	0.4513	0.4531	0.4549	0.4564	0.4572
	2	5	0	4.6142	3.2372	3.0099	3.1488	3.1824	3.2032	3.2084	3.2164	3.2363	3.2400	3.2485
	2	5	0.25	4.4271	3.1063	2.8903	3.0226	3.0560	3.0756	3.0778	3.0864	3.1036	3.1099	3.1158
	2	5	0.5	4.1440	2.9108	2.7059	2.8255	2.8604	2.8783	2.8823	2.8892	2.9032	2.9109	2.9168
	2	5	0.75	3.7520	2.6316	2.4481	2.5582	2.5870	2.6052	2.6100	2.6159	2.6277	2.6380	2.6401
	2	5	1	3.2472	2.2763	2.1181	2.2154	2.2394	2.2531	2.2567	2.2655	2.2745	2.2817	2.2859
	2	10	0	9.2284	6.4744	6.0197	6.2976	6.3648	6.4063	6.4168	6.4329	6.4726	6.4799	6.4969
	2	10	0.25	8.8541	6.2125	5.7806	6.0451	6.1120	6.1512	6.1556	6.1728	6.2072	6.2197	6.2317
	2	10	0.5	8.2879	5.8216	5.4117	5.6509	5.7208	5.7566	5.7647	5.7784	5.8065	5.8219	5.8336
	2	10	0.75	7.5040	5.2632	4.8962	5.1164	5.1740	5.2104	5.2199	5.2319	5.2554	5.2760	5.2802
	2	10	1	6.4944	4.5527	4.2362	4.4307	4.4787	4.5062	4.5134	4.5309	4.5490	4.5635	4.5719
	2	20	0	18.4569	12.9488	12.0395	12.5951	12.7296	12.8126	12.8336	12.8658	12.9452	12.9598	12.9938
	2	20	0.25	17.7083	12.4251	11.5611	12.0902	12.2241	12.3023	12.3112	12.3456	12.4145	12.4394	12.4633
	2	20	0.5	16.5759	11.6432	10.8235	11.3018	11.4417	11.5132	11.5293	11.5568	11.6129	11.6438	11.6671
	2	20	0.75	15.0080	10.5263	9.7923	10.2329	10.3479	10.4208	10.4398	10.4637	10.5109	10.5521	10.5603
	2	20	1	12.9888	9.1054	8.4724	8.8615	8.9574	9.0123	9.0268	9.0918	9.0980	9.1269	9.1437
	2	50	0	46.1421	32.3720	30.0987	31.4878	31.8239	32.0316	32.0841	32.1644	32.3630	32.3995	32.4846
	2	50	0.25	44.2706	31.0627	28.9027	30.2255	30.5601	30.7558	30.7779	30.8640	31.0362	31.0985	31.1583
	2	50	0.5	41.4397	29.1080	27.0587	28.2545	28.6042	28.7830	28.8233	28.8919	29.0323	29.1095	29.1678
	2	50	0.75	37.5201	26.3158	24.4808	25.5821	25.8698	26.0519	26.0996	26.1592	26.2772	26.3801	26.4008
	2	50	1	32.4720	22.7634	21.1810	22.1537	22.3935	22.5308	22.5669	22.6545	22.7450	22.8174	22.8594
	5	1	0	1.2228	0.8581	0.7990	0.8343	0.8440	0.8495	0.8503	0.8529	0.8578	0.8592	0.8609
	5	1	0.25	1.1956	0.8391	0.7811	0.8157	0.8248	0.8307	0.8318	0.8337	0.8384	0.8404	0.8419
	5	1	0.5	1.1546	0.8102	0.7555	0.7874	0.7968	0.8020	0.8033	0.8053	0.8096	0.8116	0.8128
	5	1	0.75	1.0997	0.7721	0.7195	0.7498	0.7586	0.7644	0.7651	0.7673	0.7703	0.7731	0.7744
	5	1	1	1.0331	0.7253	0.6764	0.7047	0.7125	0.7180	0.7187	0.7209	0.7237	0.7258	0.7274

Table 5.17 (Cont.): Average interval length of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	5	5	0	6.1141	4.2905	3.9948	4.1717	4.2201	4.2475	4.2514	4.2647	4.2889	4.2958	4.3043
	5	5	0.25	5.9781	4.1957	3.9055	4.0786	4.1239	4.1535	4.1589	4.1687	4.1922	4.2017	4.2094
	5	5	0.5	5.7730	4.0510	3.7774	3.9370	3.9837	4.0102	4.0164	4.0263	4.0482	4.0582	4.0639
	5	5	0.75	5.4985	3.8606	3.5976	3.7490	3.7928	3.8221	3.8254	3.8367	3.8517	3.8652	3.8721
	5	5	1	5.1657	3.6264	3.3820	3.5235	3.5625	3.5902	3.5932	3.6046	3.6187	3.6291	3.6369
	5	10	0	12.2282	8.5810	7.9895	8.3434	8.4402	8.4950	8.5027	5.5291	8.5778	8.5917	8.6085
	5	10	0.25	11.9562	8.3913	7.8110	8.1571	8.2477	8.3071	8.3178	8.3373	8.3844	8.4035	8.4189
	5	10	0.5	11.5460	8.1020	7.5548	7.8740	7.9675	8.0203	8.0329	8.0526	8.0963	8.1164	8.1278
	5	10	0.75	10.9970	7.7213	7.1953	7.4981	7.5857	7.6442	7.6507	7.6734	7.7033	7.7305	7.7442
	5	10	1	10.3314	7.2528	6.7640	7.0471	7.1250	7.1804	7.1865	7.2092	7.2375	7.2583	7.2738
	5	20	0	24.4565	17.1619	15.9791	16.6868	16.8804	16.9901	17.0054	17.0586	17.1557	17.1834	17.2170
	5	20	0.25	23.9123	16.7826	15.6220	16.3143	16.4954	16.6141	16.6356	16.6746	16.7689	16.8070	16.8377
	5	20	0.5	23.0920	16.2040	15.1096	15.7480	15.9349	16.0407	16.0657	16.1052	16.1927	16.2328	16.2556
	5	20	0.75	21.9940	15.4426	14.3905	14.9961	15.1713	15.2884	15.3014	15.3468	15.4066	15.4610	15.4883
	5	20	1	20.6629	14.5055	13.5281	14.0941	14.2501	14.3607	14.3730	14.4184	14.4749	14.5165	14.5475
	5	50	0	61.1411	42.9048	39.9477	41.7170	42.2010	42.4751	42.5135	42.6466	42.8892	42.9584	43.0425
	5	50	0.25	59.7808	41.9565	39.0550	40.7857	41.2386	41.5352	41.5890	41.6866	41.9221	42.0174	42.0943
	5	50	0.5	57.7299	40.5099	37.7741	39.3700	39.8373	40.1017	40.1643	40.2629	40.4817	40.5820	40.6389
	5	50	0.75	54.9849	38.6064	35.9763	37.4903	37.9284	38.2210	38.2535	38.3670	38.5165	38.6524	38.7208
	5	50	1	51.6572	36.2638	33.8202	35.2353	35.6252	35.9017	35.9324	36.0459	36.1872	36.2913	36.3688
	10	1	0	1.6033	1.1255	1.0482	1.0936	1.1063	1.1144	1.1151	1.1183	1.1246	1.1269	1.1289
	10	1	0.25	1.5827	1.1106	1.0341	1.0801	1.0915	1.1000	1.1006	1.1045	1.1103	1.1122	1.1143
	10	1	0.5	1.5515	1.0893	1.0150	1.0577	1.0702	1.0784	1.0798	1.0827	1.0877	1.0909	1.0922
	10	1	0.75	1.5116	1.0607	0.9891	1.0309	1.0423	1.0510	1.0519	1.0553	1.0599	1.0622	1.0641
	10	1	1	1.4652	1.0287	0.9585	0.9999	1.0102	1.0179	1.0191	1.0227	1.0272	1.0293	1.0312
	10	5	0	8.0162	5.6277	5.2412	5.4682	5.5313	5.5720	5.5753	5.5914	5.6230	5.6345	5.6447
	10	5	0.25	7.9135	5.5528	5.1705	5.4003	5.4575	5.5001	5.5031	5.5225	5.5517	5.5608	5.5715
	10	5	0.5	7.7575	5.4463	5.0748	5.2887	5.3511	5.3921	5.3989	5.4137	5.4385	5.4543	5.4607
	10	5	0.75	7.5578	5.3037	4.9456	5.1545	5.2116	5.2550	5.2596	5.2765	5.2994	5.3109	5.3207
	10	5	1	7.3260	5.1436	4.7927	4.9995	5.0511	5.0895	5.0954	5.1136	5.1359	5.1465	5.1559
	10	10	0	16.0325	11.2553	10.4824	10.9363	11.0626	11.1439	11.1505	11.1828	11.2460	11.2690	11.2893
	10	10	0.25	15.8269	11.1056	10.3409	10.8005	10.9149	11.0002	11.0062	11.0450	11.1034	11.1217	11.1429
	10	10	0.5	15.5151	10.8926	10.1495	10.5773	10.7021	10.7843	10.7978	10.8274	10.8770	10.9086	10.9215
	10	10	0.75	15.1157	10.6074	9.8912	10.3089	10.4232	10.5100	10.5193	10.5529	10.5988	10.6217	10.6414
	10	10	1	14.6519	10.2873	9.5853	9.9990	10.1022	10.1790	10.1909	10.2273	10.2719	10.2930	10.3117

Table 5.17 (Cont.): Average interval length of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	10	20	0	32.0650	22.5106	20.9648	21.8726	22.1253	22.2879	22.3011	22.3656	22.4920	22.5380	22.5786
	10	20	0.25	31.6539	22.2111	20.6818	21.6011	21.8298	22.0004	22.0124	22.0899	22.2068	22.2433	22.2858
	10	20	0.5	31.0301	21.7852	20.2990	21.1547	21.4043	21.5685	21.5956	21.6547	21.7540	21.8172	21.8430
	10	20	0.75	30.2313	21.2148	19.7823	20.6178	20.8465	21.0201	21.0386	21.1058	21.1976	21.2435	21.2829
	10	20	1	29.3039	20.5745	19.1707	19.9979	20.2044	20.3579	20.3818	20.4545	20.5438	20.5860	20.6234
	10	50	0	80.1624	56.2765	52.4119	54.6815	55.3132	55.7197	55.7527	55.9139	56.2300	56.3451	56.4466
	10	50	0.25	79.1347	55.5279	51.7046	54.0027	54.5745	55.0010	55.0311	55.2248	55.5171	55.6083	55.7145
	10	50	0.5	77.5753	54.4629	50.7475	52.8867	53.5107	53.9214	53.9889	54.1368	54.3851	54.5429	54.6074
	10	50	0.75	75.5783	53.0370	49.4558	51.5445	52.1162	52.5502	52.5964	52.7645	52.9940	53.1087	53.2072
	10	50	1	73.2597	51.4363	47.9266	49.9947	50.5110	50.8948	50.9544	51.1363	51.3594	51.4649	51.5585
	20	1	0	2.1738	1.5268	1.4200	1.4830	1.4993	1.5119	1.5118	1.5172	1.5250	1.5288	1.5309
	20	1	0.25	2.1591	1.5157	1.4099	1.4730	1.4885	1.5010	1.5016	1.5066	1.5145	1.5179	1.5205
	20	1	0.5	2.1367	1.5007	1.3962	1.4574	1.4732	1.4860	1.4853	1.4908	1.4984	1.5027	1.5043
	20	1	0.75	2.1069	1.4794	1.3772	1.4370	1.4528	1.4650	1.4652	1.4701	1.4774	1.4813	1.4824
	20	1	1	2.0745	1.4574	1.3576	1.4153	1.4305	1.4425	1.4425	1.4473	1.4543	1.4580	1.4598
	20	5	0	10.8692	7.6339	7.1001	7.4149	7.4966	7.5594	7.5592	7.5858	7.6252	7.6441	7.6545
	20	5	0.25	10.7957	7.5786	7.0497	7.3650	7.4426	7.5050	7.5082	7.5329	7.5727	7.5894	7.6025
	20	5	0.5	10.6833	7.5034	6.9811	7.2868	7.3660	7.4299	7.4263	7.4542	7.4921	7.5135	7.5213
	20	5	0.75	10.5347	7.3971	6.8862	7.1851	7.2640	7.3248	7.3261	7.3504	7.3870	7.4064	7.4118
	20	5	1	10.3726	7.2870	6.7878	7.0767	7.1525	7.2126	7.2126	7.2366	7.2715	7.2900	7.2992
	20	10	0	21.7384	15.2677	14.2001	14.8297	14.9932	15.1187	15.1184	15.1716	15.2504	15.2882	15.3091
	20	10	0.25	21.5914	15.1572	14.0994	14.7300	14.8852	15.0100	15.0164	15.0658	15.1453	15.1788	15.2050
	20	10	0.5	21.3665	15.0068	13.9623	14.5735	14.7320	14.8598	14.8526	14.9083	14.9842	15.0270	15.0425
	20	10	0.75	21.0695	14.7942	13.7724	14.3702	14.5280	14.6496	14.6523	14.7008	14.7740	14.8129	14.8235
	20	10	1	20.7453	14.5739	13.5755	14.1534	14.3050	14.4251	14.4252	14.4733	14.5430	14.5801	14.5984
	20	20	0	43.4768	30.5354	28.4002	29.6594	29.9864	30.2374	30.2368	30.3431	30.5009	30.5763	30.6181
	20	20	0.25	43.1828	30.3143	28.1988	29.4599	29.7704	30.0200	30.0329	30.1316	30.2907	30.3576	30.4101
	20	20	0.5	42.7330	30.0137	27.9246	29.1470	29.4639	29.7195	29.7052	29.8167	29.9685	30.0540	30.0851
	20	20	0.75	42.1389	29.5885	27.5447	28.7404	29.0559	29.2993	29.3045	29.4016	29.5480	29.6258	29.6471
	20	20	1	41.4905	29.1478	27.1511	28.3067	28.6100	28.8502	28.8504	28.9465	29.0860	29.1601	29.1969

Table 5.17 (Cont.): Average interval length of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	20	50	0	108.6921	76.3385	71.0006	74.1486	74.9660	75.5936	75.5920	75.8578	76.2522	76.4408	76.5452
	20	50	0.25	107.9570	75.7858	70.4970	73.6499	74.4260	75.0499	75.0821	75.3290	75.7267	75.8940	76.0252
	20	50	0.5	106.8326	75.0341	69.8114	72.8675	73.6598	74.2989	74.2629	74.5417	74.9211	75.1349	75.2127
	20	50	0.75	105.3472	73.9712	68.8618	71.8510	72.6398	73.2482	73.2614	73.5041	73.8700	74.0645	74.1177
	20	50	1	103.7263	72.8696	67.8777	70.7668	71.5250	72.1255	72.1261	72.3663	72.7149	72.9004	72.9922
	50	1	0	3.3452	2.3485	2.1881	2.2818	2.3083	2.3267	2.3263	2.3343	2.3463	2.3528	2.3543
	50	1	0.25	3.3362	2.3415	2.1823	2.2767	2.3016	2.3199	2.3197	2.3278	2.3400	2.3470	2.3478
	50	1	0.5	3.3213	2.3314	2.1728	2.2650	2.2913	2.3101	2.3091	2.3174	2.3287	2.3371	2.3375
	50	1	0.75	3.3019	2.3178	2.1617	2.2513	2.2787	2.2968	2.2961	2.3045	2.3150	2.3235	2.3230
	50	1	1	3.2817	2.3043	2.1485	2.2376	2.2643	2.2825	2.2811	2.2904	2.2999	2.3077	2.3091
	50	5	0	16.7261	11.7426	10.9404	11.4091	11.5414	11.6334	11.6314	11.6717	11.7315	11.7639	11.7715
	50	5	0.25	16.6808	11.7075	10.9113	11.3833	11.5078	11.5993	11.5987	11.6389	11.7000	11.7349	11.7392
	50	5	0.5	16.6067	11.6571	10.8638	11.3248	11.4564	11.5505	11.5457	11.5872	11.6434	11.6854	11.6874
	50	5	0.75	16.5092	11.5892	10.8085	11.2567	11.3934	11.4841	11.4804	11.5224	11.5749	11.6175	11.6152
	50	5	1	16.4085	11.5213	10.7424	11.1881	11.3213	11.4126	11.4054	11.4521	11.4992	11.5385	11.5453
	50	10	0	33.4522	23.4852	21.8808	22.8182	23.0828	23.2669	23.2629	23.3434	23.4629	23.5279	23.5431
	50	10	0.25	33.3615	23.4149	21.8227	22.7667	23.0156	23.1985	23.1973	23.2777	23.4000	23.4697	23.4784
	50	10	0.5	33.2134	23.3141	21.7275	22.6495	22.9128	23.1010	23.0914	23.1745	23.2868	23.3708	23.3747
	50	10	0.75	33.0185	23.1783	21.6171	22.5134	22.7869	22.9681	22.9609	23.0449	23.1498	23.2350	23.2304
	50	10	1	32.8171	23.0426	21.4848	22.3761	22.6426	22.8252	22.8107	22.9042	22.9985	23.0771	23.0905
	50	20	0	66.9045	46.9703	43.7616	45.6365	46.1656	46.5337	46.5258	46.6868	46.9258	47.0557	47.0862
	50	20	0.25	66.7231	46.8298	43.6453	45.5334	46.0313	46.3970	46.3946	46.5555	46.8000	46.9395	46.9567
	50	20	0.5	66.4267	46.6283	43.4550	45.2990	45.8257	46.2019	46.1829	46.3489	46.8736	46.7415	46.7495
	50	20	0.75	66.0370	46.3566	43.2341	45.0269	45.5737	45.9362	45.9218	46.0897	46.2996	46.4700	46.4609
	50	20	1	65.6341	46.0852	42.9696	44.7523	45.2851	45.6505	45.6214	45.8083	45.9970	46.1542	46.1810
	50	50	0	167.2612	117.4258	109.4041	114.0912	115.4140	116.3343	116.3144	116.7169	117.3146	117.6393	117.7154
	50	50	0.25	166.8077	117.0745	109.1133	113.8334	115.0782	115.9926	115.9865	116.3887	117.0001	117.3487	117.3918
	50	50	0.5	166.0668	116.5706	108.6376	113.2475	114.5642	115.5047	115.4572	115.8723	116.4339	116.8538	116.8737
	50	50	0.75	165.0925	115.8915	108.0853	112.5671	113.9343	114.8406	114.8044	115.2242	115.7490	116.1751	116.1522
	50	50	1	164.0853	115.2131	107.4239	111.8807	113.2128	114.1262	114.0536	114.5207	114.9924	115.3854	115.4526

Table 5.17 (Cont.): Average interval length of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	2	1	0	0.9228	0.6474	0.6212	0.6368	0.6430	0.6448	0.6459	0.6453	0.6493	0.6480	0.6497
	2	1	0.25	0.8854	0.6213	0.5960	0.6112	0.6174	0.6192	0.6194	0.6192	0.6227	0.6220	0.6232
	2	1	0.5	0.8288	0.5822	0.5582	0.5713	0.5779	0.5794	0.5801	0.5797	0.5824	0.5822	0.5834
	2	1	0.75	0.7504	0.5263	0.5051	0.5173	0.5228	0.5245	0.5254	0.5248	0.5271	0.5276	0.5280
	2	1	1	0.6494	0.4553	0.4368	0.4480	0.4524	0.4536	0.4542	0.4545	0.4563	0.4564	0.4572
	2	5	0	4.6142	3.2372	3.1062	3.1839	3.2150	3.2240	3.2294	3.2265	3.2464	3.2400	3.2485
	2	5	0.25	4.4271	3.1063	2.9799	3.0561	3.0872	3.0962	3.0970	3.0961	3.1134	3.1099	3.1158
	2	5	0.5	4.1440	2.9108	2.7911	2.8565	2.8896	2.8972	2.9004	2.8983	2.9121	2.9109	2.9168
	2	5	0.75	3.7520	2.6316	2.5255	2.5865	2.6141	2.6227	2.6271	2.6242	2.6356	2.6380	2.6401
	2	5	1	3.2472	2.2763	2.1839	2.2399	2.2621	2.2680	2.2711	2.2725	2.2815	2.2817	2.2859
	2	10	0	9.2284	6.4744	6.2124	6.3677	6.4300	6.4481	6.4588	6.4529	6.4928	6.4799	6.4969
	2	10	0.25	8.8541	6.2125	5.9598	6.1123	6.1744	6.1924	6.1941	6.1922	6.2267	6.2197	6.2317
0.85	2	10	0.5	8.2879	5.8216	5.5821	5.7131	5.7792	5.7943	5.8007	5.7965	5.8242	5.8219	5.8336
	2	10	0.75	7.5040	5.2632	5.0509	5.1729	5.2282	5.2453	5.2542	5.2483	5.2713	5.2760	5.2802
	2	10	1	6.4944	4.5527	4.3678	4.4799	4.5242	4.5361	4.5421	4.5449	4.5630	4.5635	4.5719
	2	20	0	18.4569	12.9488	12.4248	12.7355	12.8600	12.8962	12.9176	12.9058	12.9855	12.9598	12.9938
	2	20	0.25	17.7083	12.4251	11.9196	12.2245	12.3488	12.3848	12.3881	12.3844	12.4534	12.4394	12.4633
	2	20	0.5	16.5759	11.6432	11.1643	11.4261	11.5583	11.5887	11.6014	11.5930	11.6483	11.6438	11.6671
	2	20	0.75	15.0080	10.5263	10.1018	10.3459	10.4564	10.4907	10.5083	10.4967	10.5425	10.5521	10.5603
	2	20	1	12.9888	9.1054	8.7356	8.9598	9.0484	9.0721	9.0842	9.0899	9.1260	9.1269	9.1437
	2	50	0	46.1421	32.3720	31.0621	31.8387	32.1501	32.2404	32.2940	32.2645	32.4638	32.3995	32.4846
	2	50	0.25	44.2706	31.0627	29.7991	30.5613	30.8721	30.9621	30.9702	30.9611	31.1336	31.0985	31.1583
	2	50	0.5	41.4397	29.1080	27.9107	28.5653	28.8958	28.9717	29.0035	28.9825	29.1208	29.1095	29.1678
	2	50	0.75	37.5201	26.3158	25.2545	25.8647	26.1409	26.2267	26.2708	26.2417	26.3563	26.3801	26.4008
	2	50	1	32.4720	22.7634	21.8390	22.3994	22.6209	22.6803	22.7106	22.7247	22.8149	22.8174	22.8594

Table 5.17 (Cont.): Average interval length of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.85	5	1	0	1.2228	0.8581	0.8245	0.8436	0.8526	0.8550	0.8557	0.8556	0.8603	0.8592	0.8609
	5	1	0.25	1.1956	0.8391	0.8055	0.8249	0.8334	0.8360	0.8369	0.8363	0.8411	0.8404	0.8419
	5	1	0.5	1.1546	0.8102	0.7795	0.7961	0.8050	0.8072	0.8085	0.8078	0.8122	0.8116	0.8128
	5	1	0.75	1.0997	0.7721	0.7424	0.7584	0.7663	0.7694	0.7699	0.7697	0.7727	0.7731	0.7744
	5	1	1	1.0331	0.7253	0.6974	0.7126	0.7198	0.7228	0.7231	0.7232	0.7259	0.7258	0.7274
	5	5	0	6.1141	4.2905	4.1222	4.2179	4.2629	4.2752	4.2784	4.2780	4.3015	4.2958	4.3043
	5	5	0.25	5.9781	4.1957	4.0277	4.1245	4.1670	4.1801	4.1844	4.1816	4.2053	4.2017	4.2094
	5	5	0.5	5.7730	4.0510	3.8974	3.9807	4.0248	4.0362	4.0423	4.0390	4.0608	4.0582	4.0639
	5	5	0.75	5.4985	3.8606	3.7119	3.7918	3.8316	3.8472	3.8495	3.8483	3.8634	3.8652	3.8721
	5	5	1	5.1657	3.6264	3.4868	3.5630	3.5992	3.6141	3.6157	3.6160	3.6297	3.6291	3.6369
	5	10	0	12.2282	8.5810	8.2445	8.4357	8.5257	8.5503	8.5568	8.5560	8.6029	8.5917	8.6085
	5	10	0.25	11.9562	8.3913	8.0554	8.2490	8.3341	8.3603	8.3689	8.3631	8.4107	8.4035	8.4189
	5	10	0.5	11.5460	8.1020	7.7947	7.9614	8.0495	8.0725	8.0846	8.0780	8.1216	8.1164	8.1278
	5	10	0.75	10.9970	7.7213	7.4238	7.5835	7.6633	7.6944	7.6990	7.6966	7.7269	7.7305	7.7442
	5	10	1	10.3314	7.2528	6.9735	7.1259	7.1985	7.2282	7.2313	7.2319	7.2594	7.2583	7.2738
	5	20	0	24.4565	17.1619	16.4889	16.8714	17.0514	17.1006	17.1136	17.1119	17.2059	17.1834	17.2170
	5	20	0.25	23.9123	16.7826	16.1109	16.4979	16.6682	16.7205	16.7378	16.7263	16.8214	16.8070	16.8377
	5	20	0.5	23.0920	16.2040	15.5894	15.9228	16.0991	16.1449	16.1692	16.1559	16.2432	16.2328	16.2556
	5	20	0.75	21.9940	15.4426	14.8476	15.1670	15.3265	15.3888	15.3980	15.3932	15.4537	15.4610	15.4883
	5	20	1	20.6629	14.5055	13.9471	14.2519	14.3969	14.4564	14.4626	14.4638	14.5188	14.5165	14.5475
	5	50	0	61.1411	42.9048	41.2223	42.1786	42.6285	42.7516	42.7841	42.7798	43.0147	42.9584	43.0425
	5	50	0.25	59.7808	41.9565	40.2771	41.2448	41.6704	41.8013	41.8444	41.8156	42.0534	42.0174	42.0943
	5	50	0.5	57.7299	40.5099	38.9735	39.8069	40.2477	40.3622	40.4229	40.3898	40.6079	40.5820	40.6389
	5	50	0.75	54.9849	38.6064	37.1190	37.9175	38.3163	38.4721	38.4949	38.4831	38.6343	38.6524	38.7208
	5	50	1	51.6572	36.2638	34.8676	35.6297	35.9922	36.1411	36.1565	36.1596	36.2970	36.2913	36.3688
	10	1	0	1.6033	1.1255	1.0815	1.1061	1.1176	1.1216	1.1222	1.1217	1.1280	1.1269	1.1289
	10	1	0.25	1.5827	1.1106	1.0673	1.0921	1.1027	1.1072	1.1075	1.1079	1.1137	1.1122	1.1143
	10	1	0.5	1.5515	1.0893	1.0471	1.0696	1.0813	1.0857	1.0864	1.0861	1.0911	1.0909	1.0922
	10	1	0.75	1.5116	1.0607	1.0206	1.0426	1.0529	1.0581	1.0586	1.0586	1.0631	1.0622	1.0641
	10	1	1	1.4652	1.0287	0.9888	1.0109	1.0207	1.0245	1.0256	1.0260	1.0302	1.0293	1.0312
	10	5	0	8.1062	5.6277	5.4074	5.5306	5.5878	5.6081	5.6108	5.6086	5.6400	5.6345	5.6447
	10	5	0.25	7.9135	5.5528	5.3362	5.4605	5.5135	5.5358	5.5377	5.5393	5.5687	5.5608	5.5715
	10	5	0.5	7.7575	5.4463	5.2355	5.3478	5.4063	5.4284	5.4319	5.4305	5.4552	5.4543	5.4607
	10	5	0.75	7.5578	5.3037	5.1029	5.2127	5.2644	5.2904	5.2929	5.2929	5.3157	5.3109	5.3207
	10	5	1	7.3260	5.1436	4.9441	5.0547	5.1034	5.1225	5.1281	5.1302	5.1510	5.1465	5.1559

Table 5.17 (Cont.): Average interval length of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	10	10	0	16.0325	11.2553	10.8148	11.0611	11.1756	11.2162	11.2216	11.2173	11.2799	11.2690	11.2893
	10	10	0.25	15.8269	11.1056	10.6725	10.9210	11.0270	11.0717	11.0753	11.0789	11.1373	11.1217	11.1429
	10	10	0.5	15.5151	10.8926	10.4710	10.6957	10.8126	10.8569	10.8639	10.8610	10.9105	10.9086	10.9215
	10	10	0.75	15.1157	10.6074	10.2058	10.4255	10.5287	10.5807	10.5858	10.5858	10.6313	10.6217	10.6414
	10	10	1	14.6519	10.2873	9.8883	10.1094	10.2068	10.2451	10.2562	10.2604	10.3019	10.2930	10.3117
	10	20	0	32.0650	22.5106	21.6295	22.1222	22.3512	22.4325	22.4432	22.4345	22.5599	22.5380	22.5786
	10	20	0.25	31.6539	22.2111	21.3450	21.8420	22.0541	22.1434	22.1507	22.1572	22.2746	22.2433	22.2858
	10	20	0.5	31.0301	21.7852	20.9419	21.3913	21.6252	21.7138	21.7277	21.7220	21.8210	21.8172	21.8430
	10	20	0.75	30.2313	21.2148	20.4116	20.8509	21.0574	21.1614	21.1716	21.1716	21.2626	21.2435	21.2829
	10	20	1	29.3039	20.5745	19.7765	20.2187	20.4136	20.4901	20.5124	20.5207	20.6038	20.5860	20.6234
	10	50	0	80.1624	56.2765	54.0738	55.3056	55.8780	56.0812	56.1079	56.0863	56.3997	56.3451	56.4466
	10	50	0.25	79.1347	55.5279	53.3624	54.6051	55.1352	55.3584	55.3766	55.3930	55.6865	55.6083	55.7145
	10	50	0.5	77.5753	54.4629	52.3549	53.4784	54.0630	54.2844	54.3193	54.3049	54.5524	54.5429	54.6074
	10	50	0.75	75.5783	53.0370	51.0290	52.1273	52.6435	52.9036	52.9289	52.9291	53.1565	53.1087	53.2072
	10	50	1	73.2597	51.4363	49.4413	50.5468	51.0340	51.2253	51.2809	51.3018	51.5095	51.4649	51.5585
	20	1	0	2.1738	1.5268	1.4647	1.5000	1.5146	1.5219	1.5215	1.5219	1.5297	1.5288	1.5309
	20	1	0.25	2.1591	1.5157	1.4559	1.4898	1.5042	1.5107	1.5113	1.5113	1.5190	1.5179	1.5205
0.85	20	1	0.5	2.1367	1.5007	1.4401	1.4742	1.4879	1.4955	1.4948	1.4954	1.5031	1.5027	1.5043
	20	1	0.75	2.1069	1.4794	1.4211	1.4532	1.4678	1.4746	1.4746	1.4747	1.4819	1.4813	1.4824
	20	1	1	2.0745	1.4574	1.4006	1.4312	1.4452	1.4519	1.4518	1.4518	1.4589	1.4580	1.4598
	20	5	0	10.8692	7.6339	7.3236	7.4998	7.5729	7.6095	7.6075	7.6095	7.6485	7.6441	7.6545
	20	5	0.25	10.7957	7.5786	7.2794	7.4488	7.5217	7.5533	7.5563	7.5566	7.5948	7.5894	7.6025
	20	5	0.5	10.6833	7.5034	7.2006	7.3708	7.4397	7.4773	7.4738	7.4769	7.5155	7.5138	7.5213
	20	5	0.75	10.5347	7.3971	7.1052	7.2661	7.3391	7.3731	7.3730	7.3734	7.4093	7.4064	7.4118
	20	5	1	10.3726	7.2870	7.0029	7.1562	7.2259	7.2592	7.2589	7.2590	7.2946	7.2900	7.2992
	20	10	0	21.7384	15.2677	14.6471	14.9996	15.1458	15.2191	15.2150	15.2189	15.2969	15.2882	15.3091
	20	10	0.25	21.5914	15.1572	14.5588	14.8975	15.0422	15.1065	15.1126	15.1132	15.1897	15.1788	15.2050
	20	10	0.5	21.3665	15.0068	14.4013	14.7416	14.8793	14.9547	14.9475	14.9538	15.0309	15.0270	15.0425
	20	10	0.75	21.0695	14.7942	14.2105	14.5322	14.6782	14.7463	14.7460	14.7467	14.8186	14.8129	14.8235
	20	10	1	20.7453	14.5739	14.0058	14.3123	14.4519	14.5185	14.5177	14.5180	14.5893	14.5801	14.5984
	20	20	0	43.4768	30.5354	29.2942	29.9992	30.2916	30.4381	30.4301	30.4379	30.5938	30.5763	30.6181
	20	20	0.25	43.1828	30.3143	29.1176	29.7951	30.0843	30.2131	30.2252	30.2264	30.3794	30.3576	30.4101
	20	20	0.5	42.7330	30.0137	28.8025	29.4832	29.7587	29.9094	29.8950	29.9077	30.0618	30.0540	30.0851
	20	20	0.75	42.1389	29.5885	28.4210	29.0645	29.3565	29.4925	29.4920	29.4934	29.6372	29.6258	29.6471
	20	20	1	41.4905	29.1478	28.0115	28.6247	28.9037	29.0369	29.0354	29.0361	29.1786	29.1601	29.1969

Table 5.17 (Cont.): Average interval length of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.85	20	50	0	108.6921	76.3385	73.2355	74.9981	75.7291	76.0953	76.0752	76.0947	76.4845	76.4408	76.5452
	20	50	0.25	107.9570	75.7858	72.7941	74.4877	75.2107	75.5327	75.5629	75.5661	75.9484	75.8940	76.0252
	20	50	0.5	106.8326	75.0341	72.0063	73.7081	74.3966	74.7734	74.7376	74.7692	75.1545	75.1349	75.2127
	20	50	0.75	105.3472	73.9712	71.0524	72.6612	73.3912	73.7314	73.7300	73.7335	74.0930	74.0645	74.1177
	20	50	1	103.7263	72.8696	70.0288	71.5616	72.2593	72.5924	72.5885	72.5902	72.9464	72.9004	72.9922
	50	1	0	3.3452	2.3485	2.2594	2.3078	2.3318	2.3423	2.3410	2.3420	2.3536	2.3528	2.3543
	50	1	0.25	3.3362	2.3415	2.2533	2.3024	2.3253	2.3355	2.3346	2.3350	2.3470	2.3470	2.3478
	50	1	0.5	3.3213	2.3314	2.2424	2.2910	2.3152	2.3254	2.3241	2.3247	2.3357	2.3371	2.3375
	50	1	0.75	3.3019	2.3178	2.2304	2.2768	2.3020	2.3124	2.3104	2.3118	2.3221	2.3235	2.3230
	50	1	1	3.2817	2.3043	2.2175	2.2631	2.2877	2.2975	2.2961	2.2973	2.3071	2.3077	2.3091
	50	5	0	16.7261	11.7426	11.2969	11.5391	11.6590	11.7115	11.7050	11.7098	11.7678	11.7639	11.7715
	50	5	0.25	16.6808	11.7075	11.2666	11.5120	11.6266	11.6775	11.6731	11.6748	11.7352	11.7349	11.7392
	50	5	0.5	16.6067	11.6571	11.2120	11.4550	11.5759	11.6268	11.6207	11.6234	11.6785	11.6854	11.6874
	50	5	0.75	16.5092	11.5892	11.1518	11.3840	11.5102	11.5617	11.5519	11.5592	11.6106	11.6175	11.6152
	50	5	1	16.4085	11.5213	11.0873	11.3154	11.4387	11.4877	11.4805	11.4866	11.5353	11.5385	11.5453
	50	10	0	33.4522	23.4852	22.5937	23.0782	23.3180	23.4230	23.4099	23.4196	23.5357	23.5279	23.5431
	50	10	0.25	33.3615	23.4149	22.5332	23.0241	23.2532	23.3550	23.3463	23.3496	23.4704	23.4697	23.4784
	50	10	0.5	33.2134	23.3141	22.4241	22.9100	23.1517	23.2535	23.2413	23.2467	23.3571	23.3708	23.3747
	50	10	0.75	33.0185	23.1783	22.3036	22.7680	23.0204	23.1235	23.1037	23.1185	23.2212	23.2350	23.2304
	50	10	1	32.8171	23.0426	22.1747	22.6309	22.8773	22.9754	22.9611	22.9733	23.0706	23.0771	23.0905
	50	20	0	66.9045	46.9703	45.1874	46.1564	46.6360	46.8459	46.8198	46.8393	47.0714	47.0557	47.0862
	50	20	0.25	66.7231	46.8298	45.0664	46.0482	46.5065	46.7100	46.6925	46.6992	46.9408	46.9395	46.9567
	50	20	0.5	66.4267	46.6283	44.8481	45.8200	46.3034	46.5071	46.4826	46.4935	46.7142	46.7415	46.7495
	50	20	0.75	66.0370	46.3566	44.6073	45.5359	46.0408	46.2470	46.2074	46.2369	46.4423	46.4700	46.4609
	50	20	1	65.6341	46.0852	44.3493	45.2618	45.7546	45.9507	45.9221	45.9465	46.1412	46.1542	46.1810
	50	50	0	167.2612	117.4258	112.9685	115.3911	116.5900	117.1148	117.0495	117.0982	117.6784	117.6393	117.7154
	50	50	0.25	166.8077	117.0745	112.6660	115.1204	116.2662	116.7750	116.7313	116.7480	117.3520	117.3487	117.3918
	50	50	0.5	166.0668	116.5706	112.1203	114.5500	115.7585	116.2677	116.2066	116.2336	116.7854	116.8538	116.8737
	50	50	0.75	165.0925	115.8915	111.5182	113.8398	115.1020	115.6174	115.5186	115.5922	116.1058	116.1751	116.1522
	50	50	1	164.0853	115.2131	110.8732	113.1544	114.3865	114.8769	114.8053	114.8663	115.3530	115.3854	115.4526

Table 5.18: Average interval length of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	2	1	0	0.6562	0.4617	0.4296	0.4487	0.4535	0.4573	0.4575	0.4583	0.4611	0.4624	0.4628
	2	1	0.25	0.6305	0.4433	0.4123	0.4311	0.4354	0.4392	0.4396	0.4408	0.4435	0.4444	0.4448
	2	1	0.5	0.5922	0.4169	0.3872	0.4050	0.4088	0.4126	0.4129	0.4140	0.4164	0.4176	0.4179
	2	1	0.75	0.5375	0.3783	0.3516	0.3674	0.3712	0.3746	0.3745	0.3758	0.3777	0.3790	0.3793
	2	1	1	0.4637	0.3261	0.3032	0.3169	0.3204	0.3229	0.3233	0.3243	0.3259	0.3266	0.3270
	2	5	0	3.2810	2.3087	2.1478	2.2437	2.2676	2.2867	2.2877	2.2915	2.3053	2.3120	2.3141
	2	5	0.25	3.1525	2.2167	2.0614	2.1557	2.1770	2.1962	2.1979	2.2039	2.2174	2.2218	2.2239
	2	5	0.5	2.9610	2.0846	1.9362	2.0248	2.0438	2.0628	2.0647	2.0700	2.0822	2.0880	2.0894
	2	5	0.75	2.6873	1.8913	1.7579	1.8367	1.8558	1.8732	1.8727	1.8791	1.8885	1.8948	1.8966
	2	5	1	2.3183	1.6302	1.5159	1.5847	1.6021	1.6147	1.6166	1.6213	1.6297	1.6332	1.6350
	2	10	0	6.5620	4.6173	4.2956	4.4873	4.5352	4.5734	4.5754	4.5829	4.6105	4.6239	4.6281
	2	10	0.25	6.3050	4.4334	4.1228	4.3114	4.3541	4.3913	4.3958	4.4078	4.4348	4.4437	4.4478
	2	10	0.5	5.9219	4.1692	3.8723	4.0495	4.0877	4.1256	4.1294	4.1401	4.1644	4.1760	4.1787
	2	10	0.75	5.3746	3.7826	3.5157	3.6735	3.7115	3.7464	3.7454	3.7581	3.7770	3.7897	3.7932
	2	10	1	4.6365	3.2605	3.0319	3.1694	3.2043	3.2294	3.2332	3.2426	3.2594	3.2663	3.2701
	2	20	0	13.1240	9.2347	8.5912	8.9746	9.0705	9.1467	9.1508	9.1658	9.2211	9.2478	9.2563
	2	20	0.25	12.6099	8.8667	8.2456	8.6228	8.7082	8.7846	8.7916	8.8156	8.8696	8.8873	8.8956
	2	20	0.5	11.8439	8.3384	7.7446	8.0990	8.1754	8.2513	8.2588	8.2801	8.3287	8.3519	8.3575
	2	20	0.75	10.7493	7.5652	7.0314	7.3470	7.4230	7.4928	7.4908	7.5162	7.5540	7.5794	7.5863
	2	20	1	9.2731	6.5209	6.0638	6.3389	6.4086	6.4589	6.4663	6.4852	6.5188	6.5326	6.5401
	2	50	0	32.8100	23.0867	21.4779	22.4365	22.6762	22.8668	22.8769	22.9145	23.0527	23.1195	23.1407
	2	50	0.25	31.5248	22.1668	20.6139	21.5570	21.7704	21.6316	21.9789	22.0389	22.1739	22.2183	22.2389
	2	50	0.5	29.6097	20.8461	19.3616	20.2476	20.4384	20.6282	20.6471	20.7003	20.8218	20.8798	20.8937
	2	50	0.75	26.8731	18.9129	17.5785	18.3674	18.5576	18.7319	18.7269	18.7906	18.8849	18.9484	18.9658
	2	50	1	23.1827	16.3023	15.1594	15.8472	16.0214	16.1471	16.1658	16.2129	16.2970	16.3315	16.3503
	5	1	0	0.8679	0.6112	0.5684	0.5936	0.5997	0.6050	0.6052	0.6067	0.6099	0.6117	0.6122
	5	1	0.25	0.8489	0.5979	0.5557	0.5809	0.5868	0.5918	0.5918	0.5941	0.5968	0.5986	0.5995
	5	1	0.5	0.8208	0.5783	0.5371	0.5614	0.5674	0.5718	0.5725	0.5741	0.5770	0.5789	0.5794
	5	1	0.75	0.7823	0.5507	0.5123	0.5345	0.5406	0.5451	0.5455	0.5473	0.5494	0.5522	0.5520
	5	1	1	0.7333	0.5160	0.4801	0.5015	0.5070	0.5106	0.5115	0.5126	0.5152	0.5170	0.5173

Table 5.18 (Cont.): Average interval length of mean for Crack distribution n = 50 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	5	5	0	4.3393	3.0561	2.8418	2.9682	2.9984	3.0249	3.0262	3.0335	3.0495	3.0584	3.0611
	5	5	0.25	4.2446	2.9894	2.7784	2.9044	2.9339	2.9592	2.9589	2.9703	2.9841	2.9929	2.9973
	5	5	0.5	4.1039	2.8914	2.6853	2.8068	2.8370	2.8592	2.8627	2.8703	2.8849	2.8945	2.8971
	5	5	0.75	3.9116	2.7536	2.5616	2.6726	2.7031	2.7253	2.7277	2.7363	2.7468	2.7611	2.7598
	5	5	1	3.6666	2.5802	2.4006	2.5074	2.5350	2.5532	2.5573	2.5631	2.5762	2.5851	2.5865
	5	10	0	8.6786	6.1122	5.6837	5.9363	5.9968	6.0498	6.0524	6.0669	6.0991	6.1167	6.1222
	5	10	0.25	8.4892	5.9788	5.5568	5.8087	5.8678	5.9183	5.9178	5.9405	5.9682	5.9858	5.9946
	5	10	0.5	8.2078	5.7828	5.3706	5.6136	5.6740	5.7184	5.7254	5.7407	5.7698	5.7889	5.7941
	5	10	0.75	7.8232	5.5071	5.1232	5.3451	5.4063	5.4505	5.4554	5.4726	5.4937	5.5222	5.5196
	5	10	1	7.3332	5.1604	4.8012	5.0148	5.0700	5.1063	5.1146	5.1263	5.1524	5.1701	5.1730
	5	20	0	17.3572	12.2243	11.3674	11.8727	11.9936	12.0997	12.1047	12.1338	12.1981	12.2334	12.2443
	5	20	0.25	16.9784	11.9576	11.1136	11.6174	11.7355	11.8366	11.8357	11.8810	11.9364	11.9717	11.9891
	5	20	0.5	16.4156	11.5655	10.7412	11.2272	11.3480	11.4368	11.4508	11.4813	11.5395	11.5779	11.5882
	5	20	0.75	15.6463	11.0142	10.2464	10.6902	10.8125	10.9011	10.9107	10.9452	10.9874	11.0444	11.0391
	5	20	1	14.6665	10.3208	9.6024	10.0296	10.1400	10.2126	10.2292	10.2526	10.3048	10.3403	10.3460
	5	50	0	43.3929	30.5608	28.4184	29.6816	29.9840	30.2492	30.2617	30.3346	30.4953	30.5835	30.6108
	5	50	0.25	42.4459	29.8940	27.7839	29.0435	29.3388	29.5915	29.5891	29.7025	29.8411	29.9292	29.9729
	5	50	0.5	41.0390	28.9138	26.8530	28.0681	28.3700	28.5920	28.6271	28.7033	28.8488	28.9447	28.9705
	5	50	0.75	39.1158	27.5356	25.6160	26.7255	27.0313	27.2526	27.2767	27.3631	27.4684	27.6110	27.5978
	5	50	1	36.6661	25.8021	24.0059	25.0740	25.3501	25.5316	25.5730	25.6314	25.7621	25.8507	25.8649
	10	1	0	1.1363	0.8000	0.7451	0.7777	0.7848	0.7913	0.7928	0.7943	0.7983	0.8012	0.8019
	10	1	0.25	1.1217	0.7898	0.7354	0.7676	0.7750	0.7815	0.7824	0.7847	0.7884	0.7909	0.7920
	10	1	0.5	1.1001	0.7747	0.7211	0.7524	0.7602	0.7664	0.7679	0.7693	0.7730	0.7756	0.7768
	10	1	0.75	1.0721	0.7549	0.7025	0.7332	0.7408	0.7465	0.7483	0.7500	0.7535	0.7562	0.7568
	10	1	1	1.0373	0.7304	0.6798	0.7097	0.7170	0.7220	0.7234	0.7257	0.7296	0.7312	0.7321
	10	5	0	5.6812	4.0000	3.7253	3.8883	3.9242	3.9564	3.9641	3.9716	3.9913	4.0058	4.0093
	10	5	0.25	5.6087	3.9491	3.6768	3.8379	3.8749	3.9075	3.9119	3.9233	3.9420	3.9546	3.9599
	10	5	0.5	5.5004	3.8735	3.6052	3.7621	3.8008	3.8319	3.8393	3.8465	3.8652	3.8780	3.8838
	10	5	0.75	5.3607	3.7746	3.5124	3.6662	3.7042	3.7327	3.7414	3.7501	3.7673	3.7808	3.7840
	10	5	1	5.1866	3.6520	3.3989	3.5486	3.5852	3.6100	3.6172	3.6286	3.6480	3.6558	3.6602
	10	10	0	11.3625	8.0000	7.4505	7.7766	7.8483	7.9128	7.9283	7.9431	7.9827	8.0115	8.0186
	10	10	0.25	11.2173	7.8982	7.3536	7.6758	7.7497	7.8150	7.8239	7.8466	7.8840	7.9092	7.9197
	10	10	0.5	11.0007	7.7469	7.2105	7.5241	7.6015	7.6638	7.6786	7.6931	7.7304	7.7561	7.7676
	10	10	0.75	10.7214	7.5492	7.0247	7.3323	7.4083	7.4654	7.4828	7.5001	7.5345	7.5616	7.5680
	10	10	1	10.3732	7.3040	6.7979	7.0972	7.1703	7.2200	7.2344	7.2572	7.2960	7.3115	7.3205

Table 5.18 (Cont.): Average interval length of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	10	20	0	22.7249	16.0000	14.9010	15.5532	15.6966	15.8255	15.8566	15.8863	15.9653	16.0230	16.0372
	10	20	0.25	22.4347	15.7964	14.7071	15.3515	15.4995	15.6299	15.6477	15.6932	15.7679	15.8184	15.8395
	10	20	0.5	22.0014	15.4938	14.4210	15.0483	15.2030	15.3276	15.3572	15.3862	15.4607	15.5121	15.5352
	10	20	0.75	21.4428	15.0983	14.0495	14.6646	14.8167	14.9308	14.9657	15.0002	15.0690	15.1231	15.1361
	10	20	1	20.7463	14.6080	13.5958	14.1944	14.3406	14.4401	14.4687	14.5144	14.5919	14.6230	14.6410
	10	50	0	56.8123	40.0001	37.2525	38.8829	39.2415	39.5638	39.6414	39.7157	39.9133	40.0575	40.0931
	10	50	0.25	56.0867	39.4911	36.7677	38.3787	38.7486	39.0747	39.1193	39.2329	39.4199	39.5460	39.5987
	10	50	0.5	55.0035	38.7346	36.0524	37.6207	38.0076	38.3190	38.3930	38.4654	38.6518	38.7802	38.8379
	10	50	0.75	53.6071	37.7458	35.1237	36.6616	37.0417	37.3269	37.4141	37.5005	37.6725	37.8079	37.8402
	10	50	1	51.8658	36.5201	33.9895	35.4860	35.8515	36.1002	36.1717	36.2861	36.4798	36.5575	36.6024
	20	1	0	1.5393	1.0845	1.0090	1.0534	1.0631	1.0728	1.0738	1.0778	1.0817	1.0855	1.0865
	20	1	0.25	1.5285	1.0774	1.0021	1.0457	1.0559	1.0654	1.0660	1.0705	1.0741	1.0778	1.0785
	20	1	0.5	1.5127	1.0658	0.9921	1.0349	1.0445	1.0545	1.0553	1.0589	1.0628	1.0664	1.0670
	20	1	0.75	1.4927	1.0517	0.9783	1.0215	1.0307	1.0403	1.0410	1.0455	1.0486	1.0528	1.0527
	20	1	1	1.4679	1.0339	0.9625	1.0044	1.0134	1.0223	1.0236	1.0274	1.0316	1.0350	1.0353
	20	5	0	7.4634	5.2587	4.8913	5.1073	5.1535	5.2014	5.2049	5.2276	5.2432	5.2640	5.2636
	20	5	0.25	7.6427	5.3871	5.0104	5.2285	5.2797	5.3269	5.3300	5.3522	5.3706	5.3888	5.3927
	20	5	0.5	7.5634	5.3290	4.9606	5.1746	5.2225	5.2725	5.2767	5.2944	5.3140	5.3320	5.3352
	20	5	0.75	7.4634	5.2587	4.8913	5.1073	5.1535	5.2014	5.2049	5.2276	5.2432	5.2640	5.2636
	20	5	1	7.3394	5.1697	4.8123	5.0222	5.0672	5.1113	5.1181	5.1370	5.1578	5.1748	5.1766
	20	10	0	15.3926	10.8453	10.0901	10.5339	10.6312	10.7276	10.7380	10.7781	10.8173	10.8543	10.8647
	20	10	0.25	15.2854	10.7743	10.0207	10.4571	10.5594	10.6539	10.6600	10.7045	10.7412	10.7776	10.7853
	20	10	0.5	15.1268	10.6580	9.9212	10.3493	10.4450	10.5450	10.5534	10.5888	10.6280	10.6640	10.6703
	20	10	0.75	14.9269	10.5173	9.7827	10.2145	10.3069	10.4028	10.4097	10.4552	10.4863	10.5280	10.5273
	20	10	1	14.6788	10.3393	9.6246	10.0444	10.1344	10.2226	10.2363	10.2740	10.3155	10.3496	10.3532
	20	20	0	30.7852	21.6907	20.1801	21.0678	21.2624	21.4551	21.4761	21.5562	21.6345	21.7085	21.7294
	20	20	0.25	30.5708	21.5485	20.0415	20.9142	21.1188	21.3078	21.3201	21.4089	21.4824	21.5551	21.5706
	20	20	0.5	30.2536	21.3159	19.8425	20.6985	20.8901	21.0899	21.1067	21.1777	21.2560	21.3279	21.3406
	20	20	0.75	29.8537	21.0346	19.5353	20.4290	20.6138	20.8057	20.8194	20.9103	20.9727	21.0560	21.0545
	20	20	1	29.3575	20.6787	19.2492	20.0887	20.2687	20.4452	20.4726	20.5480	20.6311	20.6991	20.7063

Table 5.18 (Cont.): Average interval length of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.75	20	50	0	76.9631	54.2267	50.4502	52.6696	53.1560	53.6378	53.6902	53.8904	54.0863	54.2713	54.3235
	20	50	0.25	76.4269	53.8713	50.1036	52.2854	52.7971	53.2694	53.3002	53.5223	53.7060	53.8878	53.9265
	20	50	0.5	75.6339	53.2898	49.6062	51.7463	52.2252	52.7247	52.7668	52.9442	53.1400	53.3199	53.3515
	20	50	0.75	74.6343	52.5866	48.9133	51.0725	51.5345	52.0142	52.0485	52.2758	52.4317	52.6400	52.6363
	20	50	1	73.3938	51.6967	48.1231	50.2218	50.6718	51.1129	51.1814	51.3699	51.5777	51.7478	51.7658
	50	1	0	2.3668	1.6672	1.5510	1.6202	1.6353	1.6495	1.6507	1.6569	1.6641	1.6680	1.6695
	50	1	0.25	2.3596	1.6626	1.5459	1.6143	1.6307	1.6445	1.6461	1.6515	1.6588	1.6638	1.6644
	50	1	0.5	2.3491	1.6550	1.5391	1.6076	1.6230	1.6375	1.6383	1.6442	1.6511	1.6556	1.6574
	50	1	0.75	2.3362	1.6456	1.5311	1.5989	1.6144	1.6276	1.6300	1.6352	1.6426	1.6470	1.6481
	50	1	1	2.3204	1.6346	1.5205	1.5876	1.6038	1.6165	1.6184	1.6240	1.6320	1.6363	1.6371
	50	5	0	11.8340	8.3359	7.7548	8.1010	8.1763	8.2476	8.2534	8.2844	8.3203	8.3402	8.3477
	50	5	0.25	11.7978	8.3129	7.7294	8.0713	8.1534	8.2223	8.2304	8.2575	8.2938	8.3191	8.3221
	50	5	0.5	11.7454	8.2752	7.6956	8.0379	8.1150	8.1873	8.1917	8.2210	8.2554	8.2780	8.2869
	50	5	0.75	11.6810	8.2280	7.6553	7.9944	8.0717	8.1379	8.1502	8.1761	8.2130	8.2348	8.2405
	50	5	1	11.6020	8.1731	7.6027	7.9378	8.0190	8.0823	8.0918	8.1201	8.1599	8.1814	8.1854
	50	10	0	23.6680	16.6718	15.5095	16.2020	16.3526	16.4953	16.5068	16.5687	16.6406	16.6803	16.6954
	50	10	0.25	23.5956	16.6259	15.4587	16.1427	16.3068	16.4446	16.4608	16.5149	16.5876	16.6382	16.6442
	50	10	0.5	23.4909	16.5503	15.3912	16.0757	16.2299	16.3746	16.3833	16.4419	16.5108	16.5561	16.5739
	50	10	0.75	23.3619	16.4559	15.3106	15.9888	16.1435	16.2758	16.3004	16.3522	16.4260	16.4696	16.4810
	50	10	1	23.2040	16.3462	15.2054	15.8755	16.0379	16.1646	16.1836	16.2403	16.3198	16.3628	16.3709
	50	20	0	47.3360	33.3436	31.0190	32.4039	32.7051	32.9906	33.0136	33.1374	33.2812	33.3606	33.3908
	50	20	0.25	47.1912	33.2517	30.9175	32.2854	32.6136	32.8892	32.9217	33.0298	33.1752	33.2763	33.2885
	50	20	0.5	46.9818	33.1007	30.7824	32.1514	32.4598	32.7492	32.7667	32.8839	33.0216	33.1122	33.1477
	50	20	0.75	46.7238	32.9119	30.6213	31.9776	32.2869	32.5515	32.6008	32.7044	32.8521	32.9393	32.9620
	50	20	1	46.4080	32.6923	30.4107	31.7510	32.0759	32.3293	32.3672	32.4806	32.6395	32.7257	32.7417
	50	50	0	118.3399	83.3590	77.5476	81.0098	81.7628	82.4764	82.5339	82.8435	83.2029	83.4015	83.4771
	50	50	0.25	117.9780	83.1294	77.2937	80.7134	81.5340	82.2229	82.3042	82.5745	82.9379	83.1907	83.2212
	50	50	0.5	117.4544	82.7517	76.9559	80.3785	81.1495	81.8731	81.9167	82.2096	82.5540	82.7804	82.8694
	50	50	0.75	116.8095	82.2796	76.5532	79.9440	80.7173	81.3788	81.5021	81.7609	82.1301	82.3481	82.4049
	50	50	1	116.0201	81.7308	76.0268	79.3775	80.1897	80.8232	80.9180	81.2014	81.5988	81.8141	81.8543

Table 5.18 (Cont.): Average interval length of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	2	1	0	0.6562	0.4617	0.4432	0.4539	0.4582	0.4604	0.4605	0.4612	0.4625	0.4624	0.4628
	2	1	0.25	0.6305	0.4433	0.4256	0.4360	0.4399	0.4421	0.4423	0.4436	0.4448	0.4444	0.4448
	2	1	0.5	0.5922	0.4169	0.3995	0.4094	0.4129	0.4153	0.4156	0.4166	0.4177	0.4176	0.4179
	2	1	0.75	0.5375	0.3783	0.3629	0.3714	0.3750	0.3771	0.3770	0.3782	0.3788	0.3790	0.3793
	2	1	1	0.4637	0.3261	0.3130	0.3204	0.3238	0.3251	0.3253	0.3263	0.3269	0.3266	0.3270
	2	5	0	3.2810	2.3087	2.2161	2.2695	2.2910	2.3018	2.3026	2.3059	2.3124	2.3120	2.3141
	2	5	0.25	3.1525	2.2167	2.1281	2.1799	2.1993	2.2106	2.2116	2.2179	2.2240	2.2218	2.2239
	2	5	0.5	2.9610	2.0846	1.9977	2.0469	2.0646	2.0766	2.0778	2.0831	2.0886	2.0880	2.0894
	2	5	0.75	2.6873	1.8913	1.8145	1.8568	1.8749	1.8854	1.8850	1.8908	1.8941	1.8948	1.8966
	2	5	1	2.3183	1.6302	1.5648	1.6021	1.6188	1.6254	1.6267	1.6316	1.6345	1.6332	1.6350
	2	10	0	6.5620	4.6173	4.4322	4.5390	4.5820	4.6035	4.6052	4.6119	4.6248	4.6239	4.6281
	2	10	0.25	6.3050	4.4334	4.2562	4.3597	4.3987	4.4212	4.4232	4.4359	4.4479	4.4437	4.4478
0.85	2	10	0.5	5.9219	4.1692	3.9953	4.0939	4.1291	4.1533	4.1555	4.1662	4.1771	4.1760	4.1787
	2	10	0.75	5.3746	3.7826	3.6289	3.7136	3.7499	3.7708	3.7700	3.7817	3.7883	3.7897	3.7932
	2	10	1	4.6365	3.2605	3.1296	3.2041	3.2377	3.2509	3.2533	3.2631	3.2691	3.2663	3.2701
	2	20	0	13.1240	9.2347	8.8643	9.0781	9.1640	9.2070	9.2104	9.2238	9.2497	9.2478	9.2563
	2	20	0.25	12.6099	8.8667	8.5124	8.7195	8.7973	8.8425	8.8464	8.8717	8.8958	8.8873	8.8956
	2	20	0.5	11.8439	8.3384	7.9907	8.1877	8.2583	8.3065	8.3110	8.3324	8.3542	8.3519	8.3575
	2	20	0.75	10.7493	7.5652	7.2578	7.4271	7.4998	7.5416	7.5401	7.5633	7.5765	7.5794	7.5863
	2	20	1	9.2731	6.5209	6.2592	6.4083	6.4754	6.5018	6.5066	6.5263	6.5382	6.5326	6.5401
	2	50	0	32.8100	23.0867	22.1608	22.6951	22.9099	23.0175	23.0259	23.0594	23.1242	23.1195	23.1407
	2	50	0.25	31.5248	22.1668	21.2810	21.7987	21.9934	22.1062	22.1161	22.1793	22.2395	22.2183	22.2389
	2	50	0.5	29.6097	20.8461	19.9767	20.4693	20.6457	20.7664	20.7775	20.8311	20.8855	20.8798	20.8937
	2	50	0.75	26.8731	18.9129	18.1446	18.5678	18.7494	18.8541	18.8502	18.9083	18.9413	18.9484	18.9658
	2	50	1	23.1827	16.3023	15.6479	16.0207	16.1884	16.2544	16.2666	16.3156	16.3454	16.3315	16.3503

Table 5.18 (Cont.): Average interval length of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
	5	1	0	0.8679	0.6112	0.5866	0.6004	0.6060	0.6090	0.6091	0.6105	0.6118	0.6117	0.6122
	5	1	0.25	0.8489	0.5979	0.5733	0.5872	0.5928	0.5957	0.5955	0.5979	0.5987	0.5986	0.5995
	5	1	0.5	0.8208	0.5783	0.5544	0.5676	0.5731	0.5756	0.5763	0.5777	0.5787	0.5789	0.5794
	5	1	0.75	0.7823	0.5507	0.5286	0.5405	0.5461	0.5486	0.5490	0.5507	0.5510	0.5522	0.5520
	5	1	1	0.7333	0.5160	0.4953	0.5071	0.5122	0.5140	0.5148	0.5159	0.5169	0.5170	0.5173
	5	5	0	4.3393	3.0561	2.9328	3.0022	3.0298	3.0447	3.0457	3.0527	3.0589	3.0584	3.0611
	5	5	0.25	4.2446	2.9894	2.8663	8.9360	2.9638	2.9786	2.9777	2.9893	2.9933	2.9929	2.9973
	5	5	0.5	4.1039	2.8914	2.7720	2.8381	2.8656	2.8779	2.8816	2.8885	2.8937	2.8945	2.8971
	5	5	0.75	3.9116	2.7536	2.6430	2.7027	2.7304	2.7432	2.7452	2.7535	2.7551	2.7611	2.7598
	5	5	1	3.6666	2.5802	2.4764	2.5355	2.5608	2.5700	2.5737	2.5796	2.5843	2.5851	2.5865
	5	10	0	8.6786	6.1122	5.8656	6.0043	6.0595	6.0895	6.0914	6.1054	6.1178	6.1167	6.1222
	5	10	0.25	8.4892	5.9788	5.7327	5.8720	5.9275	5.9572	5.9554	5.9787	5.9866	5.9858	5.9946
	5	10	0.5	8.2078	5.7828	5.5439	5.6762	5.7313	5.7558	5.7632	5.7771	5.7874	5.7889	5.7941
	5	10	0.75	7.8232	5.5071	5.2860	5.4054	5.4607	5.4863	5.4903	5.5071	5.5101	5.5222	5.5196
	5	10	1	7.3332	5.1604	4.9527	5.0710	5.1217	5.1399	5.1475	5.1591	5.1686	5.1701	5.1730
	5	20	0	17.3572	12.2243	11.7312	12.0087	12.1190	12.1790	12.1828	12.2108	12.2355	12.2334	12.2443
	5	20	0.25	16.9784	11.9576	11.4653	11.7440	11.8551	11.9143	11.9108	11.9574	11.9732	11.9717	11.9891
0.85	5	20	0.5	16.4156	11.5655	11.0879	11.3523	11.4625	11.5115	11.5263	11.5542	11.5748	11.5779	11.5882
	5	20	0.75	15.6463	11.0142	10.5720	10.8107	10.9214	10.9727	10.9807	11.0141	11.0203	11.0444	11.0391
	5	20	1	14.6665	10.3208	9.9054	10.1420	10.2433	10.2798	10.2949	10.3182	10.3371	10.3403	10.3460
	5	50	0	43.3929	30.5608	29.3279	30.0217	30.2976	30.4474	30.4571	30.5271	30.5888	30.5835	30.6108
	5	50	0.25	42.4459	29.8940	28.6632	29.3600	29.6377	29.7858	29.7769	29.8934	29.9330	29.9292	29.9729
	5	50	0.5	41.0390	28.9138	27.7197	28.3808	28.6563	28.7789	28.8158	28.8854	28.9370	28.9447	28.9705
	5	50	0.75	39.1158	27.5356	26.4300	27.0269	27.3036	27.4317	27.4516	27.5353	27.5507	27.6110	27.5978
	5	50	1	36.6661	25.8021	24.7635	25.3551	25.6082	25.6995	25.7374	25.7955	25.8428	25.8507	25.8649
	10	1	0	1.1363	0.8000	0.7688	0.7864	0.7928	0.7965	0.7980	0.7994	0.8007	0.8012	0.8019
	10	1	0.25	1.1217	0.7898	0.7590	0.7761	0.7829	0.7866	0.7874	0.7897	0.7908	0.7909	0.7920
	10	1	0.5	1.1001	0.7747	0.7442	0.7608	0.7682	0.7713	0.7728	0.7742	0.7754	0.7756	0.7768
	10	1	0.75	1.0724	0.7549	0.7252	0.7415	0.7483	0.7514	0.7530	0.7548	0.7558	0.7562	0.7568
	10	1	1	1.0373	0.7304	0.7019	0.7178	0.7244	0.7267	0.7281	0.7303	0.7318	0.7312	0.7321
	10	5	0	5.6812	4.0000	3.8438	3.9322	3.9639	3.9825	3.9900	3.9967	4.0035	4.0058	4.0093
	10	5	0.25	5.6087	3.9491	3.7951	3.8807	3.9146	3.9330	3.9370	3.9486	3.9540	3.9546	3.9599
	10	5	0.5	5.5004	3.8735	3.7208	3.8042	3.8411	3.8566	3.8638	3.8711	3.8769	3.8780	3.8838
	10	5	0.75	5.3607	3.7746	3.6262	3.7077	3.7416	3.7572	3.7652	3.7738	3.7788	3.7808	3.7840
	10	5	1	5.1866	3.6520	3.5095	3.5889	3.6219	3.6334	3.6406	3.6516	3.6589	3.6558	3.6602

Table 5.18 (Cont.): Average interval length of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.85	10	10	0	11.3625	8.0000	7.6877	7.8643	7.9278	7.9651	7.9799	7.9935	8.0070	8.0115	8.0186
	10	10	0.25	11.2173	7.8982	7.5902	7.7613	7.8291	7.8660	7.8740	7.8972	7.9080	7.9092	7.9197
	10	10	0.5	11.0007	7.7469	7.4415	7.6084	7.6822	7.7132	7.7275	7.7421	7.7538	7.7561	7.7676
	10	10	0.75	10.7214	7.5492	7.2523	7.4153	7.4832	7.5143	7.5304	7.5477	7.5576	7.5616	7.5680
	10	10	1	10.3732	7.3040	7.0189	7.1779	7.2437	7.2669	7.2811	7.3033	7.3178	7.3115	7.3205
	10	20	0	22.7249	16.0000	15.3754	15.7286	15.8556	15.9302	15.9599	15.9869	16.0141	16.0230	16.0372
	10	20	0.25	22.4347	15.7964	15.1804	15.5226	15.6582	15.7319	15.7480	15.7943	15.8160	15.8184	15.8395
	10	20	0.5	22.0014	15.4938	14.8830	15.2168	15.3644	5.4264	15.4550	15.4842	15.5075	15.5121	15.5352
	10	20	0.75	21.4428	15.0983	14.5046	14.8306	14.9663	15.0286	15.0609	15.0954	15.1152	15.1231	15.1361
	10	20	1	20.7463	14.6080	14.0379	14.3558	14.4875	14.5337	14.5622	14.6065	14.6357	14.6230	14.6410
	10	50	0	56.8123	40.0001	38.4384	39.3215	39.6390	39.8254	39.8995	39.9673	40.0352	40.0575	4.0931
	10	50	0.25	56.0867	39.4911	37.9511	38.8065	39.1455	39.3297	39.3700	39.4858	39.5399	39.5460	39.5987
	10	50	0.5	55.0035	38.7346	37.2076	38.0419	38.4110	38.5661	38.6375	38.7105	38.7688	38.7802	38.8379
	10	50	0.75	53.6071	37.7458	36.2616	37.0765	37.4158	37.5716	37.6522	37.7384	37.7881	37.8079	37.8402
	10	50	1	51.8658	36.5201	35.0947	35.8894	36.2187	36.3343	36.4056	36.5164	36.5892	36.5575	36.6024
	20	1	0	1.5393	1.0845	1.0419	1.0654	1.0741	1.0800	1.0807	1.0847	1.0851	1.0854	1.0865
	20	1	0.25	1.5285	1.0774	1.0347	1.0578	1.0668	1.0724	1.0728	1.0771	1.0776	1.0778	1.0785
	20	1	0.5	1.5127	1.0658	1.0241	1.0466	1.0550	1.0614	1.0621	1.0656	1.0662	1.0664	1.0670
	20	1	0.75	1.4927	1.0517	1.0104	1.0328	1.0412	1.0473	1.0476	1.0519	1.0519	1.0528	1.0527
	20	1	1	1.4679	1.0339	0.9935	1.0157	1.0239	1.0289	1.0301	1.0338	1.0347	1.0350	1.0353
	20	5	0	7.6963	5.4227	5.2097	5.3267	5.3706	5.3997	5.4035	5.4233	5.4254	5.4271	5.4324
	20	5	0.25	7.6427	5.3871	5.1733	5.2889	5.3339	5.3619	5.3641	5.3855	5.3878	5.3888	5.3927
	20	5	0.5	7.5634	5.3290	5.1205	5.2332	5.2750	5.3071	5.3104	5.3280	5.3311	5.3320	5.3352
	20	5	0.75	7.4634	5.2587	5.0521	5.1642	5.2059	5.2363	5.2378	5.2596	5.2595	5.2640	5.2636
	20	5	1	7.3394	5.1697	4.9674	5.0785	5.1196	5.1446	5.1506	5.1688	5.1735	5.1748	5.1766
	20	10	0	15.3926	10.8453	10.4194	10.6535	10.7412	10.7995	10.8069	10.8466	10.8508	10.8543	10.8647
	20	10	0.25	15.2854	10.7743	10.3466	10.5779	10.6677	10.7239	10.7281	10.7709	10.7757	10.7776	10.7853
	20	10	0.5	15.1268	10.6580	10.2411	10.4664	10.5501	10.6143	10.6209	10.6561	10.6621	10.6640	10.6703
	20	10	0.75	14.9269	10.5173	10.1041	10.3283	10.4118	10.4726	10.4756	10.5192	10.5189	10.5280	10.5273
	20	10	1	14.6788	10.3393	9.9348	10.1570	10.2391	10.2892	10.3012	10.3377	10.3470	10.3496	10.3532
	20	20	0	30.7852	21.6907	20.8388	21.3070	21.4825	21.5990	21.6138	21.6932	21.7016	21.7085	21.7294
	20	20	0.25	30.5708	21.5485	20.6931	21.1558	21.3354	21.4477	21.4563	21.5418	21.5513	21.5551	21.5706
	20	20	0.5	30.2536	21.3159	20.4821	20.9327	21.1002	21.2285	21.2417	21.3121	21.3242	21.3279	21.3406
	20	20	0.75	29.8537	21.0346	20.2082	20.6566	20.8236	20.9452	20.9511	21.0384	21.0379	21.0560	21.0545
	20	20	1	29.3575	20.6787	19.8696	20.3141	20.4782	20.5783	20.6024	20.6754	20.6940	20.6991	20.7063

Table 5.18 (Cont.): Average interval length of mean for Crack distribution n = 100 (Modified Percentile)

θ	λ	ν	p	Normal Approx	Independent Bootstrap	Dependent Bootstrap								
						k = 2	k = 4	k = 6	k = 8	k = 10	k = 12	k = 20	k = 30	k = 40
0.85	20	50	0	76.9631	54.2267	52.0970	53.2674	53.7061	53.9974	54.0346	54.2329	54.2541	54.2713	54.3235
	20	50	0.25	76.4269	53.8713	51.7328	52.8894	53.3385	53.6193	53.6407	53.8546	53.8783	53.8878	53.9265
	20	50	0.5	75.6339	53.2898	51.2053	52.3318	52.7504	53.0713	53.1043	53.2804	53.3105	53.3199	53.3515
	20	50	0.75	74.6343	52.5866	50.5205	51.6416	52.0589	52.3629	52.3778	52.5960	52.5947	52.6400	52.6363
	20	50	1	73.3938	51.6967	49.6739	50.7852	51.1955	51.4458	51.5060	51.6884	51.7350	51.7478	51.7658
	50	1	0	2.3668	1.6672	1.6008	1.6384	1.6520	1.6605	1.6612	1.6671	1.6691	1.6680	1.6695
	50	1	0.25	2.3596	1.6626	1.5957	1.6328	1.6475	1.6550	1.6564	1.6619	1.6640	1.6638	1.6644
	50	1	0.5	2.3491	1.6550	1.5883	1.6257	1.6396	1.6481	1.6493	1.6548	1.6562	1.6556	1.6574
	50	1	0.75	2.3362	1.6456	1.5794	1.6171	1.6311	1.6384	1.6406	1.6456	1.6477	1.6470	1.6481
	50	1	1	2.3204	1.6346	1.5687	1.6057	1.6202	1.6269	1.6290	1.6344	1.6370	1.6363	1.6371
	50	5	0	11.8340	8.3359	8.0042	8.1921	8.2601	8.3023	8.3061	8.3356	8.3455	8.3402	8.3477
	50	5	0.25	11.7978	8.3129	7.9785	8.1641	8.2377	8.2749	8.2821	8.3094	8.3199	8.3191	8.3221
	50	5	0.5	11.7454	8.2752	7.9414	8.1285	8.1981	8.2406	8.2463	8.2741	8.2811	8.2780	8.2869
	50	5	0.75	11.6810	8.2280	7.8971	8.0854	8.1552	8.1920	8.2029	8.2278	8.2386	8.2348	8.2405
	50	5	1	11.6020	8.1731	7.8437	8.0286	8.1010	8.1346	8.1449	8.1722	8.1851	8.1814	8.1854
	50	10	0	23.6680	16.6718	16.0084	16.3843	16.5203	16.6047	16.6122	16.6711	16.6910	16.6803	16.6954
	50	10	0.25	23.5956	16.6259	15.9569	16.3283	16.4753	16.5497	16.5643	16.6189	16.6398	16.6382	16.6442
	50	10	0.5	23.4909	16.5503	15.8828	16.2569	16.3961	16.4812	16.4927	16.5483	16.5622	16.5561	16.5739
	50	10	0.75	23.3619	16.4559	15.7941	16.1707	16.3105	16.3840	16.4057	16.4555	16.4771	16.4696	16.4810
	50	10	1	23.2040	16.3462	15.6874	16.0571	16.2020	16.2692	16.2898	16.3444	16.3702	16.3628	16.3709
	50	20	0	47.3360	33.3436	32.0167	32.7685	33.0405	33.2094	33.2245	33.3422	33.3819	33.3606	33.3908
	50	20	0.25	47.1912	33.2517	31.9139	32.6566	32.9506	33.0994	33.1285	33.2377	33.2796	33.2763	33.2885
	50	20	0.5	46.9818	33.1007	31.7656	32.5138	32.7923	32.9624	32.9854	33.0366	33.1245	33.1122	33.1477
	50	20	0.75	46.7238	32.9119	31.5883	32.3414	32.6210	32.7679	32.8115	32.9110	32.9542	32.9393	32.9620
	50	20	1	46.4080	32.6923	31.3747	32.1142	32.4040	32.5385	32.5795	32.6887	32.7404	32.7257	32.7417
	50	50	0	118.3399	83.3590	80.0418	81.9213	82.6012	83.0234	83.0612	83.3556	83.4549	83.4015	83.4771
	50	50	0.25	117.9780	83.1294	79.7847	81.6414	82.3766	82.7486	82.8214	83.0943	83.1990	83.1907	83.2212
	50	50	0.5	117.4544	82.7517	79.4141	81.2845	81.9807	82.4059	82.4634	82.7414	82.8111	82.7804	82.8694
	50	50	0.75	116.8095	82.2796	78.9707	80.8536	81.5524	81.9198	82.0287	82.2776	82.3855	82.3481	82.4049
	50	50	1	116.0201	81.7308	78.4368	80.2855	81.0101	81.3462	81.4488	81.7218	81.8509	81.8141	81.8543

CHAPTER 6
CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The main goal of the computational part of the thesis is the comparison of three types of confidence interval estimation methods for both independent and dependent bootstrap procedures: the Bootstrap-t confidence interval method, the Percentile confidence interval method, and the Modified Percentile confidence interval method with $\theta = 0.75$, and $\theta = 0.85$. All types of confidence intervals are constructed for the interval estimation of the mean of the Crack distribution. The coverage probabilities and the average interval lengths are the criteria for comparing estimation methods. We considered 3 levels of sample size n $(n = 10,50,100)$, 90% confidence level, and replication factors (k copies) are $k = 2,4,6,8,10,12,20,30,40$. Using R program version 3.2.2 for Monte-Carlo technique, we simulated 1,000 times for calculation of the coverage probabilities and average interval lengths. For each simulation, the number of bootstrap samples is 2,000.

The computational result presented in Chapter 5 shows that the Modified Percentile dependent bootstrap confidence interval method with $\theta = 0.85$ gives higher coverage probabilities than other methods for all replication factors (k copies) when sample size n is large, and it is also close to 90% confidence level.

The coverage probabilities of the independent bootstrap confidence intervals are higher than the coverage probabilities of the dependent bootstrap confidence intervals for all three methods (Bootstrap-t, Percentile, and Modified Percentile), replication factors, and sample sizes n .

In addition, when replication factors (k copies) increase the coverage probabilities of the dependent bootstrap confidence intervals increase for all three methods and they are close to confidence coefficient 0.90.

Moreover, when sample size n is large, the average interval lengths of independent and dependent bootstrap confidence intervals are shorter than for the case when the sample size n is small.

The Percentile dependent bootstrap confidence interval gives the shortest average interval lengths than for other methods.

The dependent bootstrap confidence intervals: Bootstrap-t and Percentile methods provide shorter average interval lengths than those of independent bootstrap and significance is still close to nominal 90% confidence level.

On the other hand, the average interval lengths of the Modified Percentile independent bootstrap confidence interval are shorter than average interval lengths of the Modified Percentile dependent bootstrap confidence interval and closer to the nominal 90% confidence level.

In conclusion, the Modified Percentile independent bootstrap confidence interval with $\theta = 0.85$ gives the coverage probabilities which is higher than for all other methods (but still close to the nominal 90% confidence level). The average the Modified Percentile independent bootstrap confidence interval lengths are shorter than the average interval lengths of confidence intervals constructed by other methods, unless the Percentile confidence interval methods is used.

The objective of the theoretical part of this study is to derive a few results in order to obtain the first four raw moments of the Crack distribution. First of all, we start studying the theoretical part by the probability model of Crack distribution. Second, we establish the relationship between moments of the Length Biased and Inverse Gaussian distributions. Third, we establish the relationship between moments of the Length Biased and Inverse Gaussian distributions. Fourth, we derive first five raw moments of the Inverse Gaussian distribution. Next, we find the first four raw moments of the Length Biased Inverse Gaussian distribution. Finally, the first four raw moments of the Crack distribution developed by the relationship between moments of the Length Biased Inverse Gaussian and Inverse Gaussian distributions.

6.2 Recommendation

For practical applications we would recommend to use independent bootstrap Modified Percentile confidence interval with $\theta = 0.85$.

6.3 Future Study

1. Consider samples with contamination.
2. Consider other distribution different than Crack distribution.
3. Consider confidence interval that only for mean, but also for variance, median, mode, and other.

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APPENDICES

APPENDIX

R Source Code for Simulations

```
main=function(n,lambda,nu,p,theta){

#--- Create Original data ---#

CRran=function(n,lambda,nu,p)
{
        a<-array(0,dim=c(n,2))
        alpha<-array(0,dim=c(n,2))
        u<-array(0,dim=c(n,2))
        v<-array(0,dim=c(n,2))
        w<-array(0,dim=c(n,2))
        IG<-array(0,dim=c(n,2))
        LB<-array(0,dim=c(n,2))
        b<-array(0,dim=c(n,2))
        CR<-array(0,dim=c(n,2))
        alpha1<-array(0,dim=c(n,2))

for(i in 1:n)
{
for(j in 1:2)
{
        a[i,j]<-runif(1,0,1)
        alpha[i,j]<-rnorm(1,0,1)
        u[i,j]<-(lambda*nu)+(nu/2)*(alpha[i,j]^2-
        sqrt((alpha[i,j]^4)+(4*lambda*(alpha[i,j]^2))))
        v[i,j]<-(lambda*nu)/((lambda*nu)+u[i,j])
        w[i,j]<-((lambda^2)*(nu^2))/u[i,j]
if(a[i,j]<v[i,j])
```

```
{
        IG[i,j]<-u[i,j]
}
else
{
        IG[i,j]<-w[i,j]
}
        alpha1[i,j]<-rnorm(1,0,1)
        LB[i,j]<-IG[i,j]+(nu*(alpha1[i,j]^2))
        b[i,j]<-runif(1,0,1)
if(b[i,j]<p)
{
        CR[i,j]<-IG[i,j]
}
else
{
        CR[i,j]<-LB[i,j]
}
}
}
#return(list(a=a,alpha=alpha,u=u,v=v,w=w,IG=IG,LB=LB,b=b,CR=CR))
return(CR)
}
x=CRran(n,lambda,nu,p)

#----------Confidence Interval for the population mean------------#

CI=function(x){
        pars.X=rep(0,4)
        pars.X[1]=round(mean(x),5)
        pars.X[2]=round(sd(x),5)
        pars.X[3]=round(mean(x)-qnorm(0.95)*(sd(x)/sqrt(n)),5)
```

```
        pars.X[4]=round(mean(x)+qnorm(0.95)*(sd(x)/sqrt(n)),5)
        return(pars.X)
} #--- End function CI ---#

#--- Independent Bootstrap function ---#

Ind_Bt=function(x){
        x_ind=rep(0,length(x))
        x_ind=sample(x,replace=TRUE)
        return(x_ind)
} #--- End Independent Bootstrap ---#

#--- Dependent Bootstrap function ---#

Dep_Bt=function(x,k){
        x_dep=rep(0,length(x))
        if(k==2){
                x_temp=rep(0,k*length(x))
                x_temp=c(x,x)
        }
        else if(k==4){
                x_temp=rep(0,k*length(x))
                x_temp=c(x,x,x,x)
        }
        else if(k==6){
                x_temp=rep(0,k*length(x))
                x_temp=c(x,x,x,x,x,x)
        }
        else if(k==8){
                x_temp=rep(0,k*length(x))
                x_temp=c(x,x,x,x,x,x,x,x)
        }
```

```
	else if(k==10){
		x_temp=rep(0,k*length(x))
		x_temp=c(x,x,x,x,x,x,x,x,x,x)
	}
	else if(k==12){
		x_temp=rep(0,k*length(x))
		x_temp=c(x,x,x,x,x,x,x,x,x,x,x,x)
	}
	else if(k==20){
		x_temp=rep(0,k*length(x))
		x_temp=c(x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x)
	}
	else if(k==30){
		x_temp=rep(0,k*length(x))
		x_temp=c(x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x)
	}
	else if(k==40){
		x_temp=rep(0,k*length(x))
	x_temp=c(x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,
x,x,x,x)
	}
		x_dep=sample(x_temp,length(x))
	return(x_dep)
}#--- End Dependent Bootstrap ---#

#--- Start the main program ---#
#--- Initial Value ---#

x_bar=rep(0,10);sd_x=rep(0,10);t=rep(0,10)
mu=(lambda+1-p)*nu;
var=((lambda)-(p^2)-p+2)*(nu^2);
sigma=sqrt(var)
```

```
#--- cp is coverage probability      ---#
#--- al is average length of interval ---#
Li=2000; Lo=1000
set.seed(1234)
al_org=rep(0,Lo); cp_org=rep(0,Lo)
cp_pm=rep(0,10); cp_mpm=rep(0,10); cp_bt=rep(0,10); al_pm=rep(0,10)
al_mpm=rep(0,10); al_bt=rep(0,10)
lower=rep(0,10); upper=rep(0,10); z=rep(0,10)
k=c(2,4,6,8,10,12,20,30,40)
j=1
for(i in k)
{
        z[j]=theta*(sqrt((i*n-1)/(i*n-n)))*qnorm(0.95)+(1-theta)*qnorm(0.95)
        lower[j]=trunc((Li+1)*(pnorm(z[j],mean=0,sd=1,lower.tail = FALSE)))
        upper[j]=(Li+1)-lower[j]
        j=j+1
}

#--- Begin outside loop 1000 loop ---#

for(loopout in 1:Lo){
        cp_pm_t=rep(0,10); cp_mpm_t=rep(0,10); cp_bt_t=rep(0,10)
        al_pm_t=rep(0,10); al_mpm_t=rep(0,10); al_bt_t=rep(0,10)

#---------Find Confidence Interval of original data ---#
        pars_org=CI(x)

#--- Begin inside loop 2000 loop ---#

        for(loopin in 1:Li){
                x_bar_new=rep(0,10); sd_x_new=rep(0,10); t_new=rep(0,10)
```

```
#--- Create Bootstrap data ---

        k=c(2,4,6,8,10,12,20,30,40)
        x_dat=Ind_Bt(x)
        for(i in k){
                x_dat=rbind(x_dat,Dep_Bt(x,i))
        }#--- End loop for ---#
rm('x_temp')

#--- Find estimator of bootstrap data ---#
k=c(1,k); j=1
        for(i in k){
                x_bar_new[j]=mean(x_dat[j,])
                sd_x_new[j]=sd(x_dat[j,])
                if(i==1)
                        t_new[j]=(x_bar_new[j]-pars_org[1])/(sd_x_new[j]/sqrt(n))
                else
                        t_new[j]=(x_bar_new[j]-pars_org[1])/(sd_x_new[j]*sqrt((i*n-
                        1)/(n*(i*n-n))))
                        j=j+1
        }#--- End loop for ---#

        if(loopin==1){
                x_bar=x_bar_new
                sd_x=sd_x_new
                t=t_new
        }
        else{
                x_bar=rbind(x_bar,x_bar_new)
                sd_x=rbind(sd_x,sd_x_new)
                t=rbind(t,t_new)
        }#--- End if ---#
```

```
}#--- End loop for of loopin ---#
#--- Find the coverage probability and average length of CI of original data ---#

        al_org[loopout]=pars_org[4]-pars_org[3]
        if(pars_org[3]<mu && mu<pars_org[4])
                cp_org[loopout]=1
        else
                cp_org[loopout]=0

#--- Find the coverage probability and average length of CI of original data ---#
        j=1
        for(i in k){

#---Percentile Method---#
        pm_l=quantile(x_bar[,j],0.05)
        pm_u=quantile(x_bar[,j],0.95)
        bt_l=pars_org[1]-(quantile(t[,j],0.95)*(pars_org[2]/sqrt(n)))
        bt_u=pars_org[1]-(quantile(t[,j],0.05)*(pars_org[2]/sqrt(n)))

#---Modify percentile Method---#
        if(j>1){
                pm_l_m=sort(x_bar[,j])[lower[j-1]]
                pm_u_m=sort(x_bar[,j])[upper[j-1]]
        }

#--- Find average length ---#

        al_pm_t[j]=pm_u-pm_l
        al_bt_t[j]=bt_u-bt_l
        if(i==1)
                al_mpm_t[j]=pm_u-pm_l
        else
```

```
		al_mpm_t[j]=pm_u_m-pm_l_m

#--- Find coverage probability ---#

	if(pm_l<mu && mu<pm_u)cp_pm_t[j]=1
		else cp_pm_t[j]=0

	if(bt_l<mu && mu<bt_u)cp_bt_t[j]=1
		else cp_bt_t[j]=0

	if(j==1){
		cp_mpm_t[j]=cp_pm_t[j]
	}
	else{
		if(pm_l_m<mu && mu<pm_u_m)cp_mpm_t[j]=1
		else cp_mpm_t[j]=0
	}
		j=j+1
}#--- End loop for ---#

if(loopout==1){
	al_pm=al_pm_t
	al_bt=al_bt_t
	al_mpm=al_mpm_t
	cp_pm=cp_pm_t
	cp_mpm=cp_mpm_t
	cp_bt=cp_bt_t
}
else
{
	al_pm=rbind(al_pm,al_pm_t)
	al_mpm=rbind(al_mpm,al_mpm_t)
```

```
        al_bt=rbind(al_bt,al_bt_t)
        cp_pm=rbind(cp_pm,cp_pm_t)
        cp_mpm=rbind(cp_mpm,cp_mpm_t)
        cp_bt=rbind(cp_bt,cp_bt_t)
}#--- End if ---#

}#--- End loop for of loopout ---#

cat(c("Bootstrap_t"),fill=T)
cat(c("n =",n,"mu=",mu,"variance =",sigma^2),fill=T)
cat(c("Approximate Independent Dependent Bootstrap"),fill=T)
cat(c("Normal Bootstrap k=2 k=4 k=6 k=8 k=10 k=12 k=20 k=30 k=40"),fill=T)
cat(c("Coverage Probablity",round(mean(cp_org),5),"
",round(mean(cp_bt[,1]),5)," ",round(mean(cp_bt[,2]),5),"
",round(mean(cp_bt[,3]),5)," ",round(mean(cp_bt[,4]),5),"
",round(mean(cp_bt[,5]),5)," ",round(mean(cp_bt[,6]),5),"
",round(mean(cp_bt[,7]),5)," ",round(mean(cp_bt[,8]),5),"
",round(mean(cp_bt[,9]),5)," ",round(mean(cp_bt[,10]),5)),fill=T)

cat(c("Average Length",round(mean(al_org),5),"
",round(mean(al_bt[,1]),5)," ",round(mean(al_bt[,2]),5),"
",round(mean(al_bt[,3]),5)," ",round(mean(al_bt[,4]),5),"
",round(mean(al_bt[,5]),5)," ",round(mean(al_bt[,6]),5),"
",round(mean(al_bt[,7]),5)," ",round(mean(al_bt[,8]),5),"
",round(mean(al_bt[,9]),5)," ",round(mean(al_bt[,10]),5)),fill=T)
cat(c("----------------------------------------------------------"),fill=T)
cat(c("  "),fill=T)

cat(c("Percentile Method"),fill=T)
cat(c("n =",n,"mu=",mu,"variance =",sigma^2),fill=T)
cat(c("Approximate Independent Dependent Bootstrap"),fill=T)
cat(c("Normal Bootstrap k=2 k=4 k=6 k=8 k=10 k=12 k=20 k=30 k=40"),fill=T)
```

```
cat(c("Coverage Probablity",round(mean(cp_org),5),"
",round(mean(cp_pm[,1]),5)," ",round(mean(cp_pm[,2]),5),"
",round(mean(cp_pm[,3]),5)," ",round(mean(cp_pm[,4]),5),"
",round(mean(cp_pm[,5]),5)," ",round(mean(cp_pm[,6]),5),"
",round(mean(cp_pm[,7]),5)," ",round(mean(cp_pm[,8]),5),"
",round(mean(cp_pm[,9]),5)," ",round(mean(cp_pm[,10]),5)),fill=T)

cat(c("Average Length",round(mean(al_org),5),"
",round(mean(al_pm[,1]),5)," ",round(mean(al_pm[,2]),5),"
",round(mean(al_pm[,3]),5)," ",round(mean(al_pm[,4]),5),"
",round(mean(al_pm[,5]),5)," ",round(mean(al_pm[,6]),5),"
",round(mean(al_pm[,7]),5)," ",round(mean(al_pm[,8]),5),"
",round(mean(al_pm[,9]),5)," ",round(mean(al_pm[,10]),5)),fill=T)
cat(c("------------------------------------------------------------"),fill=T)
cat(c("  "),fill=T)

cat(c("Modify Percentile Method"),fill=T)
cat(c("n =",n,"mu=",mu,"variance =",sigma^2),fill=T)
cat(c("Approximate Independent Dependent Bootstrap"),fill=T)
cat(c("Normal Bootstrap k=2 k=4 k=6 k=8 k=10 k=12 k=20 k=30 k=40"),fill=T)
cat(c("Coverage Probablity ",round(mean(cp_org),5),"
",round(mean(cp_mpm[,1]),5)," ",round(mean(cp_mpm[,2]),5),"
",round(mean(cp_mpm[,3]),5)," ",round(mean(cp_mpm[,4]),5),"
",round(mean(cp_mpm[,5]),5)," ",round(mean(cp_mpm[,6]),5),"
",round(mean(cp_mpm[,7]),5)," ",round(mean(cp_mpm[,8]),5),"
",round(mean(cp_mpm[,9]),5)," ",round(mean(cp_mpm[,10]),5)),fill=T)
cat(c("Average Length ",round(mean(al_org),5),"
",round(mean(al_mpm[,1]),5)," ",round(mean(al_mpm[,2]),5),"
",round(mean(al_mpm[,3]),5)," ",round(mean(al_mpm[,4]),5),"
",round(mean(al_mpm[,5]),5)," ",round(mean(al_mpm[,6]),5),"
",round(mean(al_mpm[,7]),5)," ",round(mean(al_mpm[,8]),5),"
",round(mean(al_mpm[,9]),5)," ",round(mean(al_mpm[,10]),5)),fill=T)
```

```
cat(c("-------------------------------------------------------------"),fill=T)
cat(c("  "),fill=T)
}#--- End Main ---#
```

BIOGRAPHY

Name	Miss Preya Pichetveerachai
Date of Birth	August 2, 1990
Educational Attainment	Academic Year 2012: B.Sc. in Statistics, Thammasat University, Thailand