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THESIS

AN AD HOC BAYESIAN METHOD
FOR
DETERMINING LOWER CONFIDENCE LIMITS

by

John Courtney Cartland Jr.

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An Ad Hoc Bayesian Method
for
Determining Lower Confidence Limits

by

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ABSTRACT

This thesis proposes and analyzes an ad hoc Bayesian method for determining lower confidence limits for estimates of mission reliability of single components using pass/fail test data. Several test sequences with different underlying reliabilities are simulated. After each trial the lower confidence limits are calculated using the Classical method, the Bayesian method and the proposed method. This is followed by an accuracy simulation to estimate the accuracy of the proposed method. The proposed method shows promise for future usefulness in that it is capable of demonstrating a high degree of reliability with a relatively small number of trials while maintaining some degree of protection against accepting unreliable components.

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I. INTRODUCTION

Using pass/fail test data, there are only two methods available for determining lower confidence limits for estimates of mission reliability of single components. The methods are the Classical method and Bayesian method.

The Classical method considers mission reliability as a constant, and calculates the lower confidence limit by solving for the parameter p in the Binomial Distribution, $B(x;n,p)$. The basic advantage to this method is that it provides a conservative estimate of mission reliability, providing some protection against accepting unreliable equipment. The basic disadvantage of the Classical method is that one must pay a high premium for this conservative estimate. This premium is in the form of requiring a large number of trials in order to demonstrate a high degree of reliability. Even if no failures occur in 30 trials, the 5% lower confidence limit using the Classical method is only .91. With developing weapon systems becoming more complex and hence more expensive, determination of mission reliability using Classical methods will become more and more economically infeasible.

The Bayesian concept considers mission reliability, R, as a random variable. One particular Bayesian method assumes R has a Beta distribution. Prior to testing, a Beta density (prior density) is assumed and the test data is then used to modify the parameters of the prior density, resulting in a posterior density. The lower confidence limit is then calculated by determining the appropriate percentile point of this posterior Beta density. One advantage to this method is that it allows the use of past mission test data of technically similar systems in the determination of the reliability of the system being tested. Engineers and scientists

who are designing the present system and have had experience with technically similar systems, generally have sound intuition concerning the mission reliability of the present system. The greatest advantage of the Bayesian method is that by utilizing this intuition a high degree of reliability can be demonstrated with a relatively small number of trials. The greatest shortcoming of the Bayesian method occurs when the above intuition is incorrect. When the sum of the Beta parameters $(a + b)$ in the prior density is much greater than the number of trials to be observed, then the resulting lower confidence level is more a function of the assumed prior density than of the trials results. Thus, when the assumed prior density is incorrect and the sum of its parameters is much greater than the number of trials to be observed, then the resulting lower confidence level will be misleading.

With emerging systems becoming more and more costly, the need for a method to determine, with a small number of trials, accurate lower confidence limits of estimated reliability will become more and more pressing. The Bayesian method holds promise in this direction; but with no protection against an incorrect prior density, this method leaves much to be desired. Clearly then a Bayesian method, modified to provide protection against an incorrect prior density, would not be without merit. It was this thought that motivated the research detailed in this thesis.

II. SUMMARY

An ad hoc modified Bayesian technique was devised for calculating $100(1-\alpha)\%$ lower confidence limits. This technique has the capability of demonstrating high degrees of reliability with a relatively small number of trials, while maintaining some degree of protection against accepting inferior components. While the proposed method does show promise for future usefullness, more analysis needs to be done before it is put to use.

Prior to the testing phase, the government and the contractor will jointly decide on an initial prior Beta density along with a positive integer value for k. The proposed method uses Bayesian techniques, with the only exception being that the prior density is subject to change. As long as no failures occur, the initial prior density is used. Once a failure occurs the prior density is changed so that its mean is equal to the maximum likelihood estimate of the reliability at that point in the test sequence. If after a failure, k successive successes occur, the prior density is adjusted further towards the initial prior and so on.

Several test sequences with different underlying reliabilities were simulated. After each trail the $100(1-\alpha)\%$ lower confidence limit was calculated using the Classical method, the Bayesian method and the proposed method. After this an accuracy simulation was conducted to estimate the accuracy of the proposed method. As stated above, the results were promising.

III. ANALYSIS

In order to combine the advantages of both the Classical and Bayesian methods, the following ad hoc modified Bayesian technique was proposed for determining the lower $100(1-\alpha)\%$ confidence limit of the mission reliability of a single component, $R_L(\alpha)$.

The government and the contractor will jointly decide on an initial prior density for mission reliability, which is $\beta(r;a_o,b_o)$, by determining a value for $a_o>0$ and $b_o>0$. In addition to this prior density they will also decide on a value for k, which is a positive integer. A number of components would then be tested and given a chance to live out one mission. At any point during the test sequence, standard Bayesian techniques will be used to calculate $R_L(\alpha)$, except the prior density used in the calculation will be varied as follows.

a) If <u>no</u> failures have occurred then the prior density is just the predetermined prior density, $\beta(r;a_o,b_o)$.

b) If <u>i</u> failures have occurred then the prior is $\beta(r;a_i,b_i)$, where a_i and b_i are determined as follows: let n denote the number of tests to data, and n_i denote the test number on which the ith failure occurred, then

if $0\le n-n_i<k$ then $a_i=a_i^{(o)}=n_i-i$ and $b_i=b_i^{(o)}=i$

if $k\le n-n_i<2k$ then $a_i=a_i^{(1)}=\frac{a_o+a_i^{(o)}}{2}$ and $b_i=b_i^{(1)}=\frac{b_o+b_i^{(o)}}{2}$

if $2k\le n-n_i<3k$ then $a_i=a_i^{(2)}=\frac{a_o+a_i^{(1)}}{2}$ and $b_i=b_i^{(2)}=\frac{b_o+b_i^{(1)}}{2}$

if $jk\le n-n_i<(j+1)k$ then $a_i=a_i^{(j)}=\frac{a_o+a_i^{(j-1)}}{2}$ and $b_i=b_i^{(j)}=\frac{b_o+b_i^{(j-1)}}{2}$

for $j = 3,4,5,\ldots$

Once the prior density has been determined, then the parameters a and b of the posterior density are determined by adding the number of successes to date, to a_i, and adding the number of failures to date, to b_i. In mathematical terms $a=a_i+n-i$ and $b=b_i+i$. The $100(1-\alpha)\%$ confidence limit, $R_L(\alpha)$, is then determined by finding the αth percentile point of the posterior density, $\beta(r;a,b)$. Since the Beta density is not defined for a or b equal to zero, then $R_L(\alpha)$ is taken to the identically equal to zero, then $R_L(\alpha)$ is taken to be identically equal to zero until the first success has been achieved.

Simulation was the basic technique used to analyze and evaluate the accuracy of the method described above. Since the computations required in the simulation were completely intractable by hand, the simulation was conducted on an IBM 360 computer utilizing the FORTRAN IV source language. During the research and development phase of the development of a system, it is often the case that the reliability of a component is improved as inadequacies are found during initial testing. With this in mind, three sequences of test trials were generated, each containing increases in their underlying reliability. As in actual practice, these increases in the underlying reliability took place only after a trial had resulted in a failure. Each test sequence was continued until five failures has occurred. The underlying reliabilities used to determine the result of each trial in the three sequences are shown in Table I below.

TABLE I

UNDERLYING RELIABILITIES AFTER EACH FAILURE

Sequence Number	$R_{(1)}$	$R_{(2)}$	$R_{(3)}$	$R_{(4)}$	$R_{(5)}$
1	.50	.50	.50	.80	.80
2	.70	.70	.90	.90	.90
3	.80	.90	.95	.95	.95

The result of each trial was determined by comparing a uniformily distributed random number, on the interval [0,1], to the appropriate reliability shown above. If the random number was less than or equal to the underlying reliability, the trial resulted in a success. If the random number was greater than the underlying reliability, the trial resulted in a failure.

After the result of each trial in all the sequences had been determined, the $100(1-\alpha)\%$ lower confidence limit was determined after each trial, using the Classical method, the Bayesian method, and the proposed ad hoc modified Bayesian method.

The classical $100(1-\alpha)\%$ lower confidence level was determined by solving for the parameter p in the Binomial distribution, $B(n,p)$; that is by solving for p in the equation

$$\alpha = \sum_{j=s}^{n} \binom{n}{j} p^j (1-p)^{n-j} = \int_0^p \beta(X;s,n-s+1)dx \quad [1]$$

where α is the significance level, s is the number of successes to date, and n is the number of trials to date. Thus the classical $100(1-\alpha)\%$

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[1] Owen, D. B., Handbook of Statistical Tables, p. 264, Addison-Wesely, 1962

lower confidence level was calculated by finding the αth percentile point of the Beta density with parameters; a = the number of successes to date, and b = the number of failures to date plus 1.

To calculate the Bayesian $100(1-\alpha)\%$ lower confidence limit, the results of all previous trials in a sequence were used to modify the assumed prior density to determine a posterior density. The Bayesian confidence limit was then determined by finding the αth percentile point of the posterior density by solving for $R_L(\alpha)$ in this equation,

$$\alpha = \int_0^{R_L(\alpha)} (x; a+s,\ b+n-s)\,dx$$

where a is the value of the parameter a in the prior density, and b is the value of the parameter b in the prior density.

The ad hoc modified Bayesian $100(1-\alpha)\%$ lower confidence limit was calculated using the procedures detailed earlier in this section.

In all of the above three methods, the $100(1-\alpha)\%$ lower confidence limit was calculated by determing the αth percentile point of a Beta density, with the only difference being in the parameters of the densities used. The standardized Beta density function is defined by

$$\beta(x;a,b) = \frac{\Gamma(a+b)}{\Gamma(a)\,\Gamma(b)}\ X^{a-1}\ (1-X)^{b-1} \quad \text{for } 0<X<1, a>0, b>0$$
$$= 0 \qquad \text{otherwise}$$

thus to find the αth percentile point of a Beta density, one had to determine the value of the constant $\frac{\Gamma(a+b)}{\Gamma(a)\,\Gamma(b)}$.

The basic property used to determine the value of a Gamma function was that $\Gamma(y) = (y-1)\ \Gamma\ (y-1)$. This coupled with the approximation (accurate to the nearest 1/100,000) that $\Gamma(1+y) = 1.0 - .5771017y + .9858540y^2 - .8764218y^3 + .8328212y^4 - .5684729y^5 + .2548205y^6 - .0514993y^7$ for $0 \leq y < 1$, was all that was necessary to evaluate any

Gamma function, by using a recursive multiplication technique. Due to a limitation on the size of a number that can be stored by the computer, it was necessary to make the calculations using natural logarithms, requiring the addition of logarithms as opposed to the multiplication of the actual numbers. The final value for $\frac{\Gamma(a+b)}{\Gamma(a)\ \Gamma(b)}$ was taken as the antilogarithm of $\ln[\Gamma(a+b)] - \ln[\Gamma(a)] - \ln[\Gamma(b)]$. For complete details, see the computer program.

After having determined the value of the constant $\frac{\Gamma(a+b)}{\Gamma(a)\Gamma(b)}$ it was then necessary to evaluate the integral $\int_0^{R_{L(\alpha)}} \frac{\Gamma(a+b)}{\Gamma(a)\ \Gamma(b)} X^{a-1}(1-X)^{b-1}dx$. Since the integration would only take place over the lower tail of the Beta density, and since the lower tail of the Beta density is reasonably flat, a rectangular approximation was used to evaluate the integral.

To check the accuracy of the above procedures for determining percentile points of the Beta density, the procedures were used to determine the 25th percentile point for the following values of a and b; a=1, 1.5, 5, 30, 60, and b=1, 1.5, 2.5, 5, 10. The resulting values never varied more .01 from the tabulated values.

In order to gain further insight into the sensitivity of the proposed method to the parameter values assumed in the prior density, four pairs of parametric values were used, as shown in Table II below.

TABLE II

PRIOR DENSITIES

a	45.0	45.0	90.0	90.0
b	2.5	5.0	5.0	10.0

$100(1-\alpha)\%$ lower confidence levels were calculated after each trial, using

the Classical method, the Bayesian method and ad hoc modified Bayesian method with the four different priors shown above and for the modified Bayesian method with k=5,10. These lower confidence levels were calculated for significance levels of .05, .10, and .20. For computed results see the computer output.

After completing this, a simulation was conducted to determine the accuracy of the proposed method. To accomplish this, three test sequences, each with one underlying reliability and consisting of 30 trials, were generated. The underlying reliabilities used in the three sequences to determine the outcome of a trial were; .80, .90, and .95. After each trial, the $100(1-\alpha)\%$ lower confidence limit was calculated using the ad hoc modified Bayesian method with the four prior densities shown in Table I and for the three significance levels of .05, .10, and .20. The above was then replicated 40 times, resulting in 40 lower confidence limits for each trial in each sequence, for each prior density and for each value of α. These 40 lower confidence limits were then ordered according to magnitude. If the proposed method is accurate, then one would expect $100(1-\alpha)\%$ of the values for each trial to be less than or equal to the underlying reliability and $100(\alpha)\%$ of the values to be greater than the underlying reliability. For the case where $\alpha=.20$, and with 40 values, one would expect the 9th highest value to be less than or equal to the underlying reliability, and one would expect the 8th highest value to be greater than the underlying reliability. These values are tabulated in Table IV, for the case k=5. As an example, to read the accuracy estimate for the proposed method after 25 trials when the underlying reliability is .80 and for the prior distribution defined

by a = 45 and b = 5, one must turn to that portion of the table labeled Underlying Reliability = .80, and read down the first column to trial number 25, and from columns 2 and 3 (corresponding to a=45, b=5) extract the values .81 and .82.

IV. RESULTS

For a complete listing of the computed results of the first simulation, see the Computer Output. This simulation run, along with many additional runs, using different random numbers, pointed out three basic characteristics of the proposed method.

The first characteristic is that the proposed method is capable of demonstrating a high degree of reliability with a relatively small number of trials.

The second and most important characteristic is that the proposed method is much more sensitive than the Bayesian method to the underlying reliability, thus providing a degree of protection against the assumption of an incorrect prior density. For example, in one simulation run the first 18 trials resulted in 13 successes and 5 failures. The maximum likelihood estimate of the underlying reliability would be 13/18 = .72. At the end of the 18 trials, the computed 80% lower confidence limits were as shown in Table III below.

TABLE III

80% LOWER CONFIDENCE LIMITS

A	B	CCL20 (Classical)	BCL20 (Bayesian)	WCL20 (Modified)
45.0	5.0	.60	.82	.67
90.0	10.0	.60	.85	.67
47.5	2.5	.60	.86	.67
95.0	5.0	.60	.90	.67

As pointed out by Sequence 1 in the Accuracy Simulation, the degree of protection is not complete, but one must expect to pay some price for the capability of demonstrating high degrees of reliability with a small number of trials.

The third characteristic indicated in this study is that there is little difference between the computed ad hoc confidence limit for k=5 and k=10. The only time the results are greatly different is when the trial is the 5th, 6th, 7th, 8th, or 9th consecutive success. Only a small portion of the trials fell in the above category.

For a partial listing of the results from the accuracy simulation see Table IV. Sequence 1 of the accuracy simulation demonstrates the degree of protection provided by the proposed method. There was a significant drop in the reliability estimate between the 7th and 8th trial. Of the 40 replications of Sequence 1, 9 of the replications resulted in the first 7 trials being all successes, where only 4 of the replications resulted in the first 8 trials being all successes. With this being the case, the accuracy estimate for trials 1 thru 7 is really an accuracy estimate of the Bayesian method, while for trials 8 thru 30 it is an accuracy estimate of the ad hoc method.

Further analysis of the data pointed out two counterintuitive characteristics of the proposed method. From the description of the proposed method, one would expect the proposed method to yield a result somewhere in between the results yielded by the Classical method and the Bayesian method. This is not always the case. If the Bayesian prior density underestimates the underlying reliability, then it is possible for the ad hoc method to yield a result that is higher than those yielded by either the Classical or Bayesian methods. This is caused by the fact that the Bayesian method is fairly insensitive to the underlying reliability coupled with the fact that the Classical method is very conservative when the number of trials is small. For an example of the above, see Sequence 3 in the Computer Output. It is also possible for

the proposed method to yield a result that is lower than either the Classical or the Bayesian result. This result is achieved only when a sequence begins with two or more failures, an unlikely event for a component having an underlying reliability of .80 or higher. If a sequence does begin with two failures and then a success, the proposed method will continue to give lower results than the Classical method until the next failure occurs.

The second counterintuitive characteristic of the proposed method is that it is possible to get an increase in the lower confidence limit from trial i to trial i+1, even though trial i+1 resulted in a failure. In order for this to occur, with the values of k tested, two conditions must hold. The first is that the sequence must begin with a failure, followed by a success, and the second condition is that the second failure must occur before there are k successive successes. To understand what causes the increase in the lower confidence limit it is necessary to realize that when a sequence begins as stated above, the proposed method will yield the same results as the Classical method until either the kth successive success or until the second failure, whichever comes first. With this being the case, then if $j<k$ successive successes have occurred, the ad hoc posterior density will be $\beta(x;j,1)$, and if the next trial results in a failure the ad hoc posterior density will be $\beta(x;2j,2)$ yielding a higher lower confidence limit.

TABLE IV

RESULTS OF ACCURACY SIMULATION FOR $\alpha = .20$

UNDERLYING RELIABILITY - .80

a	45.0		90.0		47.5		95.0	
b	5.0		10.0		2.5		5.0	
Trial #	9th	8th	9th	8th	9th	8th	9th	8th
1	.87	.87	.88	.88	.93	.93	.94	.94
2	.88	.88	.88	.88	.94	.94	.94	.94
3	.88	.88	.88	.88	.94	.94	.94	.94
4	.88	.88	.89	.89	.94	.94	.94	.94
5	.88	.88	.89	.89	.94	.94	.94	.94
6	.89	.89	.89	.89	.94	.94	.94	.94
7	.89	.89	.89	.89	.94	.94	.94	.94
8	.82	.82	.82	.82	.86	.87	.88	.88
9	.80	.83	.80	.83	.84	.84	.86	.86
10	.81	.81	.80	.80	.84	.84	.86	.86
11	.81	.81	.80	.81	.85	.85	.87	.87
12	.81	.82	.81	.81	.86	.86	.87	.87
13	.80	.80	.80	.80	.86	.86	.87	.87
14	.81	.83	.80	.82	.87	.88	.88	.88
15	.81	.82	.81	.82	.87	.87	.88	.88
16	.82	.82	.82	.82	.85	.87	.87	.88
17	.83	.84	.83	.84	.87	.88	.88	.88
18	.84	.84	.84	.84	.86	.88	.88	.88
19	.82	.83	.82	.83	.86	.86	.87	.87
20	.82	.82	.81	.82	.86	.87	.88	.88
21	.82	.82	.82	.83	.86	.87	.88	.88
22	.82	.82	.82	.82	.85	.87	.87	.88
23	.82	.83	.82	.83	.85	.85	.87	.87
24	.81	.83	.81	.82	.86	.86	.87	.87
25	.81	.82	.81	.81	.85	.86	.86	.87
26	.82	.82	.82	.82	.86	.87	.87	.88
27	.83	.83	.82	.82	.87	.87	.88	.88
28	.83	.83	.82	.83	.87	.87	.88	.88
29	.84	.85	.84	.85	.88	.88	.88	.89
30	.84	.84	.84	.84	.88	.88	.88	.88

TABLE IV (Con't)

RESULTS OF ACCURACY SIMULATION FOR $\alpha = .20$

UNDERLYING RELIABILITY = .90

a	45.0		90.0		47.5		95.0	
b	5.0		10.0		2.5		5.0	
Trial #	9th	8th	9th	8th	9th	8th	9th	8th
1	.87	.87	.88	.88	.93	.93	.94	.94
2	.88	.88	.88	.88	.94	.94	.94	.94
3	.88	.88	.88	.88	.94	.94	.94	.94
4	.88	.88	.89	.89	.94	.94	.94	.94
5	.88	.88	.89	.89	.94	.94	.94	.94
6	.89	.89	.89	.89	.94	.94	.94	.94
7	.89	.89	.89	.89	.94	.94	.94	.94
8	.89	.89	.89	.89	.94	.94	.94	.94
9	.89	.89	.89	.89	.94	.94	.94	.94
10	.89	.89	.89	.89	.94	.94	.94	.94
11	.90	.90	.89	.89	.95	.95	.94	.94
12	.90	.90	.89	.89	.95	.95	.95	.95
13	.90	.90	.90	.90	.95	.95	.95	.95
14	.90	.90	.90	.90	.95	.95	.95	.95
15	.90	.90	.90	.90	.95	.95	.95	.95
16	.90	.90	.90	.90	.95	.95	.95	.95
17	.91	.91	.90	.90	.93	.95	.94	.95
18	.91	.91	.90	.90	.93	.93	.94	.94
19	.91	.91	.90	.90	.93	.93	.94	.94
20	.91	.91	.90	.90	.93	.93	.94	.94
21	.91	.91	.90	.90	.93	.93	.94	.94
22	.90	.91	.90	.90	.93	.93	.94	.94
23	.90	.90	.90	.90	.94	.94	.94	.94
24	.90	.90	.90	.90	.94	.94	.94	.94
25	.90	.90	.90	.90	.94	.94	.94	.94
26	.90	.90	.90	.90	.94	.94	.94	.94
27	.90	.90	.90	.90	.94	.94	.94	.94
28	.91	.91	.90	.90	.93	.94	.93	.94
29	.91	.91	.90	.90	.93	.93	.93	.93
30	.91	.91	.90	.90	.92	.93	.92	.92

TABLE IV (Con't)

RESULTS OF ACCURACY SIMULATION FOR $\alpha = .20$

UNDERLYING RELIABILITY = .95

a	45.0		90.0		47.5		95.0	
b	5.0		10.0		2.5		5.0	
Trial #	9th	8th	9th	8th	9th	8th	9th	8th
1	.87	.87	.88	.88	.93	.93	.94	.94
2	.88	.88	.88	.88	.94	.94	.94	.94
3	.88	.88	.88	.88	.94	.94	.94	.94
4	.88	.88	.89	.89	.94	.94	.94	.94
5	.88	.88	.89	.89	.94	.94	.94	.94
6	.89	.89	.89	.89	.94	.94	.94	.94
7	.89	.89	.89	.89	.94	.94	.94	.94
8	.89	.89	.89	.89	.94	.94	.94	.94
9	.89	.89	.89	.89	.94	.94	.94	.94
10	.89	.89	.89	.89	.94	.94	.94	.94
11	.90	.90	.89	.89	.95	.95	.94	.94
12	.90	.90	.89	.89	.95	.95	.95	.95
13	.90	.90	.90	.90	.95	.95	.95	.95
14	.90	.90	.90	.90	.95	.95	.95	.95
15	.90	.90	.90	.90	.95	.95	.95	.95
16	.90	.90	.90	.90	.95	.95	.95	.95
17	.91	.91	.90	.90	.95	.95	.95	.95
18	.91	.91	.90	.90	.95	.95	.95	.95
19	.91	.91	.90	.90	.95	.95	.95	.95
20	.91	.91	.90	.90	.95	.95	.95	.95
21	.91	.91	.90	.90	.95	.95	.95	.95
22	.91	.91	.90	.90	.95	.95	.95	.95
23	.91	.91	.90	.90	.96	.96	.95	.95
24	.91	.91	.90	.90	.96	.96	.95	.95
25	.92	.94	.91	.94	.96	.96	.95	.95
26	.92	.92	.91	.91	.96	.96	.95	.95
27	.92	.92	.91	.91	.96	.96	.95	.95
28	.92	.92	.91	.91	.96	.96	.95	.95
29	.92	.92	.91	.91	.96	.96	.96	.96
30	.92	.92	.91	.91	.96	.96	.96	.96

V. CONCLUSIONS

The ad hoc modified Bayesian technique for determining $100(1-\alpha)\%$ lower confidence limits, holds significant promise for future usefulness. It has the capability of demonstrating high degrees of reliability with a relatively small number of trials while maintaining some degree of protection against accepting an inferior component because of the assumption of a prior density that overestimates the reliability of the component.

While the proposed method shows promise, much analysis still needs to be done before it is put to use. More analysis is needed to determine the sensitivity of the method to the value of k. The method also has to be investigated over a wider range of underlying reliabilities and assumed prior densities. In this "Missile Age" where component mission reliabilities of .99+ are not rare, a definite need for analysis exists, to determine appropriate values for k. After 3xk successive successes have occurred, the proposed method yields essentially the same results as the Bayesian method, thus to choose a k that is too small will result in the loss of protection afforded by the method. To pick a k that is too large will result in values quite close to those given by the Classical method, thus requiring a larger number of trials.

COMPUTER OUTPUT

SIGNIFICANCE LEVEL = .05

SEQUENCE NUMBER 1

UNDERLYING RELIABILITIES 0.50 0.50 0.50 0.80 0.80

TRIAL NUMBER	TRIAL RESULT	A	B	CCL05	BCL05	K=5 WCL05	K=10 WCL05
1	0	45.00	5.00	0.00	0.81	0.00	0.00
		90.00	10.00	0.00	0.84	0.00	0.00
		47.50	2.50	0.00	0.87	0.00	0.00
		95.00	5.00	0.00	0.90	0.00	0.00
2	1	45.00	5.00	0.03	0.81	0.03	0.03
		90.00	10.00	0.03	0.84	0.03	0.03
		47.50	2.50	0.03	0.87	0.03	0.03
		95.00	5.00	0.03	0.90	0.03	0.03
3	1	45.00	5.00	0.14	0.81	0.14	0.14
		90.00	10.00	0.14	0.84	0.14	0.14
		47.50	2.50	0.14	0.88	0.14	0.14
		95.00	5.00	0.14	0.90	0.14	0.14
4	0	45.00	5.00	0.10	0.79	0.23	0.23
		90.00	10.00	0.10	0.83	0.23	0.23
		47.50	2.50	0.10	0.85	0.23	0.23
		95.00	5.00	0.10	0.89	0.23	0.23
5	1	45.00	5.00	0.19	0.80	0.29	0.29
		90.00	10.00	0.19	0.84	0.29	0.29
		47.50	2.50	0.19	0.86	0.29	0.29
		95.00	5.00	0.19	0.89	0.29	0.29
6	1	45.00	5.00	0.28	0.80	0.35	0.35
		90.00	10.00	0.28	0.84	0.35	0.35
		47.50	2.50	0.28	0.86	0.35	0.35
		95.00	5.00	0.28	0.90	0.35	0.35
7	0	45.00	5.00	0.23	0.78	0.36	0.36
		90.00	10.00	0.23	0.83	0.36	0.36
		47.50	2.50	0.23	0.84	0.36	0.36
		95.00	5.00	0.23	0.88	0.36	0.36
8	1	45.00	5.00	0.29	0.79	0.40	0.40
		90.00	10.00	0.29	0.83	0.40	0.40
		47.50	2.50	0.29	0.84	0.40	0.40
		95.00	5.00	0.29	0.89	0.40	0.40
9	1	45.00	5.00	0.35	0.79	0.43	0.43
		90.00	10.00	0.35	0.83	0.43	0.43
		47.50	2.50	0.35	0.84	0.43	0.43
		95.00	5.00	0.35	0.89	0.43	0.43
10	1	45.00	5.00	0.40	0.79	0.46	0.46
		90.00	10.00	0.40	0.83	0.46	0.46
		47.50	2.50	0.40	0.85	0.46	0.46
		95.00	5.00	0.40	0.89	0.46	0.46
11	1	45.00	5.00	0.44	0.80	0.48	0.48
		90.00	10.00	0.44	0.83	0.48	0.48
		47.50	2.50	0.44	0.85	0.48	0.48
		95.00	5.00	0.44	0.89	0.48	0.48

TRIAL NUMBER	TRIAL RESULT	A	B	CCLO5	BCLO5	K=5 WCLO5	K=10 WCLO5
12	1	45.00	5.00	0.48	0.80	0.70	0.51
		90.00	10.00	0.48	0.84	0.73	0.51
		47.50	2.50	0.48	0.85	0.77	0.51
		95.00	5.00	0.48	0.89	0.81	0.51
13	1	45.00	5.00	0.51	0.80	0.71	0.53
		90.00	10.00	0.51	0.84	0.74	0.53
		47.50	2.50	0.51	0.85	0.78	0.53
		95.00	5.00	0.51	0.89	0.82	0.53
14	0	45.00	5.00	0.47	0.79	0.57	0.57
		90.00	10.00	0.47	0.83	0.57	0.57
		47.50	2.50	0.47	0.84	0.57	0.57
		95.00	5.00	0.47	0.88	0.57	0.57
15	1	45.00	5.00	0.49	0.79	0.59	0.59
		90.00	10.00	0.49	0.83	0.59	0.59
		47.50	2.50	0.49	0.84	0.59	0.59
		95.00	5.00	0.49	0.88	0.59	0.59
16	1	45.00	5.00	0.52	0.79	0.60	0.60
		90.00	10.00	0.52	0.83	0.60	0.60
		47.50	2.50	0.52	0.84	0.60	0.60
		95.00	5.00	0.52	0.88	0.60	0.60
17	1	45.00	5.00	0.54	0.80	0.61	0.61
		90.00	10.00	0.54	0.83	0.61	0.61
		47.50	2.50	0.54	0.84	0.61	0.61
		95.00	5.00	0.54	0.88	0.61	0.61
18	0	45.00	5.00	0.51	0.78	0.60	0.60
		90.00	10.00	0.51	0.82	0.60	0.60
		47.50	2.50	0.51	0.83	0.60	0.60
		95.00	5.00	0.51	0.87	0.60	0.60

SIGNIFICANCE LEVEL = .05

SEQUENCE NUMBER 2

UNDERLYING RELIABILITIES 0.70 0.70 0.90 0.90 0.90

TRIAL NUMBER	TRIAL RESULT	A	B	CCL05	BCL05	K=5 WCL05	K=10 WCL05
1	1	45.00	5.00	0.06	0.83	0.83	0.83
		90.00	10.00	0.06	0.85	0.85	0.85
		47.50	2.50	0.06	0.90	0.90	0.90
		95.00	5.00	0.06	0.92	0.92	0.92
2	1	45.00	5.00	0.23	0.83	0.83	0.83
		90.00	10.00	0.23	0.85	0.85	0.85
		47.50	2.50	0.23	0.90	0.90	0.90
		95.00	5.00	0.23	0.92	0.92	0.92
3	1	45.00	5.00	0.37	0.84	0.84	0.84
		90.00	10.00	0.37	0.86	0.86	0.86
		47.50	2.50	0.37	0.90	0.90	0.90
		95.00	5.00	0.37	0.92	0.92	0.92
4	1	45.00	5.00	0.48	0.84	0.84	0.84
		90.00	10.00	0.48	0.86	0.86	0.86
		47.50	2.50	0.48	0.90	0.90	0.90
		95.00	5.00	0.48	0.92	0.92	0.92
5	1	45.00	5.00	0.55	0.84	0.84	0.84
		90.00	10.00	0.55	0.86	0.86	0.86
		47.50	2.50	0.55	0.91	0.91	0.91
		95.00	5.00	0.55	0.92	0.92	0.92
6	0	45.00	5.00	0.42	0.82	0.64	0.64
		90.00	10.00	0.42	0.85	0.64	0.64
		47.50	2.50	0.42	0.88	0.64	0.64
		95.00	5.00	0.42	0.91	0.64	0.64
7	1	45.00	5.00	0.48	0.83	0.67	0.67
		90.00	10.00	0.48	0.85	0.67	0.67
		47.50	2.50	0.48	0.88	0.67	0.67
		95.00	5.00	0.48	0.91	0.67	0.67
8	1	45.00	5.00	0.53	0.83	0.69	0.69
		90.00	10.00	0.53	0.85	0.69	0.69
		47.50	2.50	0.53	0.89	0.69	0.69
		95.00	5.00	0.53	0.91	0.69	0.69
9	1	45.00	5.00	0.58	0.83	0.71	0.71
		90.00	10.00	0.58	0.85	0.71	0.71
		47.50	2.50	0.58	0.89	0.71	0.71
		95.00	5.00	0.58	0.91	0.71	0.71
10	1	45.00	5.00	0.61	0.84	0.73	0.73
		90.00	10.00	0.61	0.85	0.73	0.73
		47.50	2.50	0.61	0.89	0.73	0.73
		95.00	5.00	0.61	0.91	0.73	0.73
11	1	45.00	5.00	0.64	0.84	0.76	0.74
		90.00	10.00	0.64	0.86	0.77	0.74
		47.50	2.50	0.64	0.89	0.83	0.74
		95.00	5.00	0.64	0.91	0.85	0.74
12	1	45.00	5.00	0.67	0.84	0.77	0.75
		90.00	10.00	0.67	0.86	0.77	0.75
		47.50	2.50	0.67	0.89	0.84	0.75
		95.00	5.00	0.67	0.91	0.85	0.75

TRIAL NUMBER	TRIAL RESULT	A	B	CCL05	BCL05	K=5 WCL05	K=10 WCL05
13	1	45.00	5.00	0.69	0.84	0.77	0.77
		90.00	10.00	0.69	0.86	0.77	0.77
		47.50	2.50	0.69	0.90	0.84	0.77
		95.00	5.00	0.69	0.91	0.85	0.77
14	1	45.00	5.00	0.71	0.85	0.78	0.78
		90.00	10.00	0.71	0.86	0.78	0.78
		47.50	2.50	0.71	0.90	0.85	0.78
		95.00	5.00	0.71	0.91	0.86	0.78
15	1	45.00	5.00	0.73	0.85	0.78	0.79
		90.00	10.00	0.73	0.86	0.78	0.79
		47.50	2.50	0.73	0.90	0.85	0.79
		95.00	5.00	0.73	0.92	0.86	0.79
16	1	45.00	5.00	0.74	0.85	0.84	0.79
		90.00	10.00	0.74	0.86	0.86	0.78
		47.50	2.50	0.74	0.90	0.89	0.85
		95.00	5.00	0.74	0.92	0.91	0.86
17	0	45.00	5.00	0.68	0.83	0.79	0.79
		90.00	10.00	0.68	0.85	0.79	0.79
		47.50	2.50	0.68	0.88	0.79	0.79
		95.00	5.00	0.68	0.91	0.79	0.79
18	1	45.00	5.00	0.69	0.84	0.79	0.79
		90.00	10.00	0.69	0.85	0.79	0.79
		47.50	2.50	0.69	0.88	0.79	0.79
		95.00	5.00	0.69	0.91	0.79	0.79
19	0	45.00	5.00	0.65	0.82	0.74	0.74
		90.00	10.00	0.65	0.85	0.74	0.74
		47.50	2.50	0.65	0.87	0.74	0.74
		95.00	5.00	0.65	0.90	0.74	0.74
20	1	45.00	5.00	0.66	0.82	0.75	0.75
		90.00	10.00	0.66	0.85	0.75	0.75
		47.50	2.50	0.66	0.87	0.75	0.75
		95.00	5.00	0.66	0.90	0.75	0.75
21	1	45.00	5.00	0.68	0.83	0.75	0.75
		90.00	10.00	0.68	0.85	0.75	0.75
		47.50	2.50	0.68	0.87	0.75	0.75
		95.00	5.00	0.68	0.90	0.75	0.75
22	1	45.00	5.00	0.69	0.83	0.76	0.76
		90.00	10.00	0.69	0.85	0.76	0.76
		47.50	2.50	0.69	0.87	0.76	0.76
		95.00	5.00	0.69	0.90	0.76	0.76
23	1	45.00	5.00	0.70	0.83	0.77	0.77
		90.00	10.00	0.70	0.85	0.77	0.77
		47.50	2.50	0.70	0.87	0.77	0.77
		95.00	5.00	0.70	0.90	0.77	0.77
24	1	45.00	5.00	0.71	0.83	0.79	0.77
		90.00	10.00	0.71	0.85	0.79	0.77
		47.50	2.50	0.71	0.88	0.84	0.77
		95.00	5.00	0.71	0.90	0.85	0.77
25	1	45.00	5.00	0.72	0.83	0.80	0.78
		90.00	10.00	0.72	0.85	0.79	0.78
		47.50	2.50	0.72	0.88	0.84	0.78
		95.00	5.00	0.72	0.90	0.86	0.78
26	1	45.00	5.00	0.73	0.84	0.80	0.78
		90.00	10.00	0.73	0.85	0.79	0.78
		47.50	2.50	0.73	0.88	0.85	0.78
		95.00	5.00	0.73	0.90	0.86	0.78

TRIAL NUMBER	TRIAL RESULT	A	B	CCL05	BCL05	K=5 WCL05	K=10 WCL05
27	1	45.00	5.00	0.74	0.84	0.80	0.79
		90.00	10.00	0.74	0.86	0.80	0.79
		47.50	2.50	0.74	0.88	0.85	0.79
		95.00	5.00	0.74	0.90	0.86	0.79
28	1	45.00	5.00	0.75	0.84	0.81	0.79
		90.00	10.00	0.75	0.86	0.80	0.79
		47.50	2.50	0.75	0.88	0.85	0.79
		95.00	5.00	0.75	0.90	0.86	0.79
29	0	45.00	5.00	0.72	0.83	0.79	0.79
		90.00	10.00	0.72	0.85	0.79	0.79
		47.50	2.50	0.72	0.87	0.79	0.79
		95.00	5.00	0.72	0.90	0.79	0.79
30	1	45.00	5.00	0.73	0.83	0.79	0.79
		90.00	10.00	0.73	0.85	0.79	0.79
		47.50	2.50	0.73	0.87	0.79	0.79
		95.00	5.00	0.73	0.90	0.79	0.79
31	1	45.00	5.00	0.73	0.83	0.79	0.79
		90.00	10.00	0.73	0.85	0.79	0.79
		47.50	2.50	0.73	0.87	0.79	0.79
		95.00	5.00	0.73	0.90	0.79	0.79
32	1	45.00	5.00	0.74	0.83	0.80	0.80
		90.00	10.00	0.74	0.85	0.80	0.80
		47.50	2.50	0.74	0.87	0.80	0.80
		95.00	5.00	0.74	0.90	0.80	0.80
33	1	45.00	5.00	0.75	0.84	0.80	0.80
		90.00	10.00	0.75	0.85	0.80	0.80
		47.50	2.50	0.75	0.87	0.80	0.80
		95.00	5.00	0.75	0.90	0.80	0.80
34	1	45.00	5.00	0.76	0.84	0.82	0.80
		90.00	10.00	0.76	0.85	0.81	0.80
		47.50	2.50	0.76	0.88	0.86	0.80
		95.00	5.00	0.76	0.90	0.86	0.80
35	1	45.00	5.00	0.76	0.84	0.82	0.81
		90.00	10.00	0.76	0.86	0.81	0.81
		47.50	2.50	0.76	0.88	0.86	0.81
		95.00	5.00	0.76	0.90	0.86	0.81
36	1	45.00	5.00	0.77	0.84	0.82	0.81
		90.00	10.00	0.77	0.85	0.81	0.81
		47.50	2.50	0.77	0.88	0.86	0.81
		95.00	5.00	0.77	0.90	0.87	0.81
37	1	45.00	5.00	0.77	0.84	0.82	0.81
		90.00	10.00	0.77	0.86	0.81	0.81
		47.50	2.50	0.77	0.88	0.86	0.81
		95.00	5.00	0.77	0.90	0.87	0.81
38	1	45.00	5.00	0.78	0.85	0.83	0.82
		90.00	10.00	0.78	0.86	0.81	0.82
		47.50	2.50	0.78	0.88	0.86	0.82
		95.00	5.00	0.78	0.90	0.87	0.82
39	1	45.00	5.00	0.79	0.85	0.84	0.83
		90.00	10.00	0.79	0.86	0.85	0.82
		47.50	2.50	0.79	0.88	0.87	0.86
		95.00	5.00	0.79	0.90	0.89	0.87
40	1	45.00	5.00	0.79	0.85	0.84	0.83
		90.00	10.00	0.79	0.86	0.85	0.82
		47.50	2.50	0.79	0.88	0.87	0.87
		95.00	5.00	0.79	0.90	0.89	0.87

TRIAL NUMBER	TRIAL RESULT	A	B	CCL05	BCL05	K=5 WCL05	K=10 WCL05
41	1	45.00	5.00	0.80	0.85	0.84	0.83
		90.00	10.00	0.80	0.86	0.86	0.82
		47.50	2.50	0.80	0.88	0.87	0.87
		95.00	5.00	0.80	0.90	0.89	0.87
42	1	45.00	5.00	0.80	0.85	0.85	0.83
		90.00	10.00	0.80	0.86	0.86	0.82
		47.50	2.50	0.80	0.89	0.87	0.87
		95.00	5.00	0.80	0.91	0.89	0.87
43	1	45.00	5.00	0.80	0.85	0.85	0.84
		90.00	10.00	0.80	0.86	0.86	0.82
		47.50	2.50	0.80	0.89	0.88	0.87
		95.00	5.00	0.80	0.91	0.89	0.87
44	1	45.00	5.00	0.81	0.86	0.85	0.84
		90.00	10.00	0.81	0.86	0.86	0.82
		47.50	2.50	0.81	0.89	0.88	0.87
		95.00	5.00	0.81	0.91	0.90	0.88
45	1	45.00	5.00	0.81	0.86	0.85	0.84
		90.00	10.00	0.81	0.87	0.86	0.83
		47.50	2.50	0.81	0.89	0.88	0.87
		95.00	5.00	0.81	0.91	0.90	0.88
46	1	45.00	5.00	0.82	0.86	0.86	0.84
		90.00	10.00	0.82	0.87	0.86	0.83
		47.50	2.50	0.82	0.89	0.89	0.88
		95.00	5.00	0.82	0.91	0.90	0.88
47	1	45.00	5.00	0.82	0.86	0.86	0.84
		90.00	10.00	0.82	0.87	0.87	0.83
		47.50	2.50	0.82	0.89	0.89	0.88
		95.00	5.00	0.82	0.91	0.90	0.88
48	1	45.00	5.00	0.82	0.86	0.86	0.85
		90.00	10.00	0.82	0.87	0.87	0.83
		47.50	2.50	0.82	0.89	0.89	0.88
		95.00	5.00	0.82	0.91	0.90	0.88
49	1	45.00	5.00	0.83	0.86	0.86	0.86
		90.00	10.00	0.83	0.87	0.87	0.86
		47.50	2.50	0.83	0.89	0.89	0.88
		95.00	5.00	0.83	0.91	0.91	0.90
50	0	45.00	5.00	0.81	0.85	0.85	0.85
		90.00	10.00	0.81	0.86	0.85	0.85
		47.50	2.50	0.81	0.88	0.85	0.85
		95.00	5.00	0.81	0.90	0.85	0.85

SIGNIFICANCE LEVEL = .05

SEQUENCE NUMBER 3

UNDERLYING RELIABILITIES 0.80 0.90 0.95 0.95 0.95

TRIAL NUMBER	TRIAL RESULT	A	B	CCL05	BCL05	K=5 WCL05	K=10 WCL05
1	0	45.00	5.00	0.00	0.81	0.00	0.00
		90.00	10.00	0.00	0.84	0.00	0.00
		47.50	2.50	0.00	0.87	0.00	0.00
		95.00	5.00	0.00	0.90	0.00	0.00
2	1	45.00	5.00	0.03	0.81	0.03	0.03
		90.00	10.00	0.03	0.84	0.03	0.03
		47.50	2.50	0.03	0.87	0.03	0.03
		95.00	5.00	0.03	0.90	0.03	0.03
3	1	45.00	5.00	0.14	0.81	0.14	0.14
		90.00	10.00	0.14	0.84	0.14	0.14
		47.50	2.50	0.14	0.88	0.14	0.14
		95.00	5.00	0.14	0.90	0.14	0.14
4	1	45.00	5.00	0.25	0.82	0.25	0.25
		90.00	10.00	0.25	0.85	0.25	0.25
		47.50	2.50	0.25	0.88	0.25	0.25
		95.00	5.00	0.25	0.91	0.25	0.25
5	0	45.00	5.00	0.19	0.80	0.35	0.35
		90.00	10.00	0.19	0.84	0.35	0.35
		47.50	2.50	0.19	0.86	0.35	0.35
		95.00	5.00	0.19	0.89	0.35	0.35
6	1	45.00	5.00	0.28	0.80	0.40	0.40
		90.00	10.00	0.28	0.84	0.40	0.40
		47.50	2.50	0.28	0.86	0.40	0.40
		95.00	5.00	0.28	0.90	0.40	0.40
7	1	45.00	5.00	0.35	0.80	0.44	0.44
		90.00	10.00	0.35	0.84	0.44	0.44
		47.50	2.50	0.35	0.86	0.44	0.44
		95.00	5.00	0.35	0.90	0.44	0.44
8	1	45.00	5.00	0.41	0.81	0.48	0.48
		90.00	10.00	0.41	0.84	0.48	0.48
		47.50	2.50	0.41	0.86	0.48	0.48
		95.00	5.00	0.41	0.90	0.48	0.48
9	1	45.00	5.00	0.46	0.81	0.51	0.51
		90.00	10.00	0.46	0.84	0.51	0.51
		47.50	2.50	0.46	0.87	0.51	0.51
		95.00	5.00	0.46	0.90	0.51	0.51
10	1	45.00	5.00	0.50	0.81	0.72	0.54
		90.00	10.00	0.50	0.84	0.74	0.54
		47.50	2.50	0.50	0.87	0.79	0.54
		95.00	5.00	0.50	0.90	0.83	0.54
11	1	45.00	5.00	0.53	0.82	0.72	0.57
		90.00	10.00	0.53	0.85	0.75	0.57
		47.50	2.50	0.53	0.87	0.80	0.57
		95.00	5.00	0.53	0.90	0.83	0.57
12	1	45.00	5.00	0.57	0.82	0.73	0.59
		90.00	10.00	0.57	0.85	0.75	0.59
		47.50	2.50	0.57	0.87	0.80	0.59
		95.00	5.00	0.57	0.90	0.83	0.59

TRIAL NUMBER	TRIAL RESULT	A	B	CCL05	BCL05	K=5 WCL05	K=10 WCL05
13	1	45.00	5.00	0.59	0.82	0.74	0.61
		90.00	10.00	0.59	0.85	0.75	0.61
		47.50	2.50	0.59	0.87	0.81	0.61
		95.00	5.00	0.59	0.90	0.83	0.61
14	1	45.00	5.00	0.62	0.83	0.74	0.63
		90.00	10.00	0.62	0.85	0.76	0.63
		47.50	2.50	0.62	0.88	0.81	0.63
		95.00	5.00	0.62	0.90	0.84	0.63
15	1	45.00	5.00	0.64	0.83	0.81	0.75
		90.00	10.00	0.64	0.85	0.84	0.76
		47.50	2.50	0.64	0.88	0.86	0.81
		95.00	5.00	0.64	0.90	0.89	0.84
16	1	45.00	5.00	0.66	0.83	0.81	0.75
		90.00	10.00	0.66	0.85	0.84	0.76
		47.50	2.50	0.66	0.88	0.86	0.82
		95.00	5.00	0.66	0.90	0.89	0.84
17	1	45.00	5.00	0.68	0.83	0.82	0.76
		90.00	10.00	0.68	0.85	0.84	0.77
		47.50	2.50	0.68	0.88	0.86	0.82
		95.00	5.00	0.68	0.91	0.89	0.84
18	1	45.00	5.00	0.69	0.84	0.82	0.76
		90.00	10.00	0.69	0.85	0.84	0.77
		47.50	2.50	0.69	0.88	0.86	0.83
		95.00	5.00	0.69	0.91	0.89	0.85
19	1	45.00	5.00	0.71	0.84	0.82	0.77
		90.00	10.00	0.71	0.86	0.84	0.77
		47.50	2.50	0.71	0.89	0.87	0.83
		95.00	5.00	0.71	0.91	0.89	0.85
20	1	45.00	5.00	0.72	0.84	0.83	0.77
		90.00	10.00	0.72	0.86	0.85	0.78
		47.50	2.50	0.72	0.89	0.88	0.83
		95.00	5.00	0.72	0.91	0.90	0.85
21	1	45.00	5.00	0.73	0.84	0.84	0.78
		90.00	10.00	0.73	0.86	0.85	0.78
		47.50	2.50	0.73	0.89	0.88	0.84
		95.00	5.00	0.73	0.91	0.90	0.85
22	1	45.00	5.00	0.75	0.85	0.84	0.78
		90.00	10.00	0.75	0.86	0.85	0.78
		47.50	2.50	0.75	0.89	0.88	0.84
		95.00	5.00	0.75	0.91	0.90	0.85
23	1	45.00	5.00	0.76	0.85	0.84	0.79
		90.00	10.00	0.76	0.86	0.86	0.78
		47.50	2.50	0.76	0.89	0.88	0.84
		95.00	5.00	0.76	0.91	0.90	0.86
24	1	45.00	5.00	0.77	0.85	0.84	0.79
		90.00	10.00	0.77	0.86	0.86	0.79
		47.50	2.50	0.77	0.89	0.89	0.85
		95.00	5.00	0.77	0.91	0.91	0.86
25	0	45.00	5.00	0.72	0.83	0.80	0.80
		90.00	10.00	0.72	0.85	0.80	0.80
		47.50	2.50	0.72	0.88	0.80	0.80
		95.00	5.00	0.72	0.90	0.80	0.80
26	1	45.00	5.00	0.73	0.84	0.81	0.81
		90.00	10.00	0.73	0.85	0.81	0.81
		47.50	2.50	0.73	0.88	0.81	0.81
		95.00	5.00	0.73	0.90	0.81	0.81

TRIAL NUMBER	TRIAL RESULT	A	B	CCL05	BCL05	K=5 WCL05	K=10 WCL05
27	1	45.00	5.00	0.74	0.84	0.81	0.81
		90.00	10.00	0.74	0.86	0.81	0.81
		47.50	2.50	0.74	0.88	0.81	0.81
		95.00	5.00	0.74	0.90	0.81	0.81
28	1	45.00	5.00	0.75	0.84	0.81	0.81
		90.00	10.00	0.75	0.86	0.81	0.81
		47.50	2.50	0.75	0.88	0.81	0.81
		95.00	5.00	0.75	0.90	0.81	0.81
29	1	45.00	5.00	0.76	0.84	0.82	0.82
		90.00	10.00	0.76	0.86	0.82	0.82
		47.50	2.50	0.76	0.88	0.82	0.82
		95.00	5.00	0.76	0.91	0.82	0.82
30	1	45.00	5.00	0.77	0.85	0.82	0.82
		90.00	10.00	0.77	0.86	0.81	0.82
		47.50	2.50	0.77	0.88	0.86	0.82
		95.00	5.00	0.77	0.91	0.87	0.82
31	1	45.00	5.00	0.77	0.85	0.82	0.82
		90.00	10.00	0.77	0.86	0.81	0.82
		47.50	2.50	0.77	0.89	0.86	0.82
		95.00	5.00	0.77	0.91	0.87	0.82
32	1	45.00	5.00	0.78	0.85	0.82	0.83
		90.00	10.00	0.78	0.86	0.81	0.83
		47.50	2.50	0.78	0.89	0.87	0.83
		95.00	5.00	0.78	0.91	0.87	0.83
33	1	45.00	5.00	0.79	0.85	0.83	0.83
		90.00	10.00	0.79	0.86	0.81	0.83
		47.50	2.50	0.79	0.89	0.87	0.83
		95.00	5.00	0.79	0.91	0.87	0.83
34	1	45.00	5.00	0.79	0.85	0.83	0.83
		90.00	10.00	0.79	0.86	0.82	0.83
		47.50	2.50	0.79	0.89	0.87	0.83
		95.00	5.00	0.79	0.91	0.87	0.83
35	1	45.00	5.00	0.80	0.85	0.85	0.83
		90.00	10.00	0.80	0.86	0.85	0.82
		47.50	2.50	0.80	0.89	0.88	0.87
		95.00	5.00	0.80	0.91	0.90	0.87
36	1	45.00	5.00	0.80	0.86	0.85	0.83
		90.00	10.00	0.80	0.87	0.86	0.82
		47.50	2.50	0.80	0.89	0.88	0.87
		95.00	5.00	0.80	0.91	0.90	0.88
37	1	45.00	5.00	0.81	0.86	0.85	0.84
		90.00	10.00	0.81	0.87	0.86	0.82
		47.50	2.50	0.81	0.89	0.88	0.88
		95.00	5.00	0.81	0.91	0.90	0.88
38	1	45.00	5.00	0.81	0.86	0.86	0.84
		90.00	10.00	0.81	0.87	0.86	0.82
		47.50	2.50	0.81	0.90	0.89	0.88
		95.00	5.00	0.81	0.91	0.90	0.88
39	1	45.00	5.00	0.82	0.86	0.86	0.84
		90.00	10.00	0.82	0.87	0.86	0.82
		47.50	2.50	0.82	0.90	0.89	0.88
		95.00	5.00	0.82	0.91	0.90	0.88
40	1	45.00	5.00	0.82	0.86	0.86	0.84
		90.00	10.00	0.82	0.87	0.87	0.83
		47.50	2.50	0.82	0.90	0.89	0.88
		95.00	5.00	0.82	0.91	0.91	0.88

TRIAL NUMBER	TRIAL RESULT	A	B	CCL05	BCL05	K=5 WCL05	K=10 WCL05
41	1	45.00	5.00	0.83	0.86	0.86	0.84
		90.00	10.00	0.83	0.87	0.87	0.83
		47.50	2.50	0.83	0.90	0.89	0.88
		95.00	5.00	0.83	0.91	0.91	0.88
42	1	45.00	5.00	0.83	0.87	0.86	0.85
		90.00	10.00	0.83	0.87	0.87	0.83
		47.50	2.50	0.83	0.90	0.90	0.88
		95.00	5.00	0.83	0.91	0.91	0.88
43	1	45.00	5.00	0.83	0.87	0.87	0.85
		90.00	10.00	0.83	0.87	0.87	0.83
		47.50	2.50	0.83	0.90	0.90	0.89
		95.00	5.00	0.83	0.91	0.91	0.88
44	1	45.00	5.00	0.84	0.87	0.87	0.85
		90.00	10.00	0.84	0.87	0.87	0.83
		47.50	2.50	0.84	0.90	0.90	0.89
		95.00	5.00	0.84	0.92	0.91	0.89
45	1	45.00	5.00	0.84	0.87	0.87	0.87
		90.00	10.00	0.84	0.87	0.87	0.87
		47.50	2.50	0.84	0.90	0.90	0.89
		95.00	5.00	0.84	0.92	0.91	0.91
46	1	45.00	5.00	0.85	0.87	0.87	0.87
		90.00	10.00	0.85	0.87	0.87	0.87
		47.50	2.50	0.85	0.90	0.90	0.90
		95.00	5.00	0.85	0.92	0.91	0.91
47	1	45.00	5.00	0.85	0.87	0.87	0.87
		90.00	10.00	0.85	0.88	0.87	0.87
		47.50	2.50	0.85	0.91	0.90	0.90
		95.00	5.00	0.85	0.92	0.92	0.91
48	0	45.00	5.00	0.82	0.86	0.87	0.87
		90.00	10.00	0.82	0.87	0.87	0.87
		47.50	2.50	0.82	0.89	0.87	0.87
		95.00	5.00	0.82	0.91	0.87	0.87
49	1	45.00	5.00	0.83	0.86	0.87	0.87
		90.00	10.00	0.83	0.87	0.87	0.87
		47.50	2.50	0.83	0.89	0.87	0.87
		95.00	5.00	0.83	0.91	0.87	0.87
50	1	45.00	5.00	0.83	0.86	0.87	0.87
		90.00	10.00	0.83	0.87	0.87	0.87
		47.50	2.50	0.83	0.90	0.87	0.87
		95.00	5.00	0.83	0.91	0.87	0.87
51	1	45.00	5.00	0.83	0.87	0.88	0.88
		90.00	10.00	0.83	0.87	0.88	0.88
		47.50	2.50	0.83	0.90	0.88	0.88
		95.00	5.00	0.83	0.91	0.88	0.88
52	1	45.00	5.00	0.84	0.87	0.88	0.88
		90.00	10.00	0.84	0.87	0.88	0.88
		47.50	2.50	0.84	0.90	0.88	0.88
		95.00	5.00	0.84	0.91	0.88	0.88
53	1	45.00	5.00	0.84	0.87	0.87	0.88
		90.00	10.00	0.84	0.87	0.88	0.88
		47.50	2.50	0.84	0.90	0.90	0.88
		95.00	5.00	0.84	0.91	0.89	0.88
54	0	45.00	5.00	0.82	0.86	0.86	0.86
		90.00	10.00	0.82	0.87	0.86	0.86
		47.50	2.50	0.82	0.89	0.86	0.86
		95.00	5.00	0.82	0.90	0.86	0.86

SIGNIFICANCE LEVEL = .10

SEQUENCE NUMBER 1

UNDERLYING RELIABILITIES 0.50 0.50 0.50 0.80 0.80

TRIAL NUMBER	TRIAL RESULT	A	B	CCL10	BCL10	K=5 WCL10	K=10 WCL10
1	0	45.00	5.00	0.00	0.83	0.00	0.00
		90.00	10.00	0.00	0.86	0.00	0.00
		47.50	2.50	0.00	0.89	0.00	0.00
		95.00	5.00	0.00	0.91	0.00	0.00
2	1	45.00	5.00	0.06	0.83	0.06	0.06
		90.00	10.00	0.06	0.86	0.06	0.06
		47.50	2.50	0.06	0.89	0.06	0.06
		95.00	5.00	0.06	0.92	0.06	0.06
3	1	45.00	5.00	0.20	0.83	0.20	0.20
		90.00	10.00	0.20	0.86	0.20	0.20
		47.50	2.50	0.20	0.89	0.20	0.20
		95.00	5.00	0.20	0.92	0.20	0.20
4	0	45.00	5.00	0.15	0.81	0.28	0.28
		90.00	10.00	0.15	0.85	0.28	0.28
		47.50	2.50	0.15	0.87	0.28	0.28
		95.00	5.00	0.15	0.91	0.28	0.28
5	1	45.00	5.00	0.25	0.82	0.35	0.35
		90.00	10.00	0.25	0.85	0.35	0.35
		47.50	2.50	0.25	0.87	0.35	0.35
		95.00	5.00	0.25	0.91	0.35	0.35
6	1	45.00	5.00	0.34	0.82	0.41	0.41
		90.00	10.00	0.34	0.85	0.41	0.41
		47.50	2.50	0.34	0.88	0.41	0.41
		95.00	5.00	0.34	0.91	0.41	0.41
7	0	45.00	5.00	0.28	0.80	0.41	0.41
		90.00	10.00	0.28	0.84	0.41	0.41
		47.50	2.50	0.28	0.86	0.41	0.41
		95.00	5.00	0.28	0.90	0.41	0.41
8	1	45.00	5.00	0.35	0.81	0.44	0.44
		90.00	10.00	0.35	0.84	0.44	0.44
		47.50	2.50	0.35	0.86	0.44	0.44
		95.00	5.00	0.35	0.90	0.44	0.44
9	1	45.00	5.00	0.41	0.81	0.47	0.47
		90.00	10.00	0.41	0.84	0.47	0.47
		47.50	2.50	0.41	0.86	0.47	0.47
		95.00	5.00	0.41	0.90	0.47	0.47
10	1	45.00	5.00	0.45	0.81	0.50	0.50
		90.00	10.00	0.45	0.85	0.50	0.50
		47.50	2.50	0.45	0.86	0.50	0.50
		95.00	5.00	0.45	0.90	0.50	0.50
11	1	45.00	5.00	0.49	0.82	0.53	0.53
		90.00	10.00	0.49	0.85	0.53	0.53
		47.50	2.50	0.49	0.87	0.53	0.53
		95.00	5.00	0.49	0.90	0.53	0.53
12	1	45.00	5.00	0.53	0.82	0.73	0.55
		90.00	10.00	0.53	0.85	0.75	0.55
		47.50	2.50	0.53	0.87	0.80	0.55
		95.00	5.00	0.53	0.90	0.83	0.55

TRIAL NUMBER	TRIAL RESULT	A	B	CCL10	BCL10	K=5 WCL10	K=10 WCL10
13	1	45.00	5.00	0.56	0.82	0.74	0.57
		90.00	10.00	0.56	0.85	0.76	0.57
		47.50	2.50	0.56	0.87	0.80	0.57
		95.00	5.00	0.56	0.90	0.83	0.57
14	0	45.00	5.00	0.51	0.81	0.61	0.61
		90.00	10.00	0.51	0.84	0.61	0.61
		47.50	2.50	0.51	0.86	0.61	0.61
		95.00	5.00	0.51	0.89	0.61	0.61
15	1	45.00	5.00	0.54	0.81	0.62	0.62
		90.00	10.00	0.54	0.84	0.62	0.62
		47.50	2.50	0.54	0.86	0.62	0.62
		95.00	5.00	0.54	0.89	0.62	0.62
16	1	45.00	5.00	0.57	0.81	0.63	0.63
		90.00	10.00	0.57	0.84	0.63	0.63
		47.50	2.50	0.57	0.86	0.63	0.63
		95.00	5.00	0.57	0.89	0.63	0.63
17	1	45.00	5.00	0.59	0.82	0.64	0.64
		90.00	10.00	0.59	0.85	0.64	0.64
		47.50	2.50	0.59	0.86	0.64	0.64
		95.00	5.00	0.59	0.90	0.64	0.64
18	0	45.00	5.00	0.55	0.80	0.63	0.63
		90.00	10.00	0.55	0.84	0.63	0.63
		47.50	2.50	0.55	0.84	0.63	0.63
		95.00	5.00	0.55	0.88	0.63	0.63

SIGNIFICANCE LEVEL = .10

SEQUENCE NUMBER 2

UNDERLYING RELIABILITIES 0.70 0.70 0.90 0.90 0.90

TRIAL NUMBER	TRIAL RESULT	A	B	CCL10	BCL10	K=5 WCL10	K=10 WCL10
1	1	45.00	5.00	0.11	0.85	0.85	0.85
		90.00	10.00	0.11	0.87	0.87	0.87
		47.50	2.50	0.11	0.92	0.92	0.92
		95.00	5.00	0.11	0.93	0.93	0.93
2	1	45.00	5.00	0.32	0.85	0.85	0.85
		90.00	10.00	0.32	0.87	0.87	0.87
		47.50	2.50	0.32	0.92	0.92	0.92
		95.00	5.00	0.32	0.93	0.93	0.93
3	1	45.00	5.00	0.47	0.86	0.86	0.86
		90.00	10.00	0.47	0.87	0.87	0.87
		47.50	2.50	0.47	0.92	0.92	0.92
		95.00	5.00	0.47	0.93	0.93	0.93
4	1	45.00	5.00	0.57	0.86	0.86	0.86
		90.00	10.00	0.57	0.87	0.87	0.87
		47.50	2.50	0.57	0.92	0.92	0.92
		95.00	5.00	0.57	0.93	0.93	0.93
5	1	45.00	5.00	0.64	0.86	0.86	0.86
		90.00	10.00	0.64	0.87	0.87	0.87
		47.50	2.50	0.64	0.92	0.92	0.92
		95.00	5.00	0.64	0.93	0.93	0.93
6	0	45.00	5.00	0.49	0.84	0.69	0.69
		90.00	10.00	0.49	0.86	0.69	0.69
		47.50	2.50	0.49	0.90	0.69	0.69
		95.00	5.00	0.49	0.92	0.69	0.69
7	1	45.00	5.00	0.55	0.85	0.72	0.72
		90.00	10.00	0.55	0.86	0.72	0.72
		47.50	2.50	0.55	0.90	0.72	0.72
		95.00	5.00	0.55	0.92	0.72	0.72
8	1	45.00	5.00	0.60	0.85	0.74	0.74
		90.00	10.00	0.60	0.86	0.74	0.74
		47.50	2.50	0.60	0.90	0.74	0.74
		95.00	5.00	0.60	0.92	0.74	0.74
9	1	45.00	5.00	0.64	0.85	0.75	0.75
		90.00	10.00	0.64	0.87	0.75	0.75
		47.50	2.50	0.64	0.90	0.75	0.75
		95.00	5.00	0.64	0.92	0.75	0.75
10	1	45.00	5.00	0.67	0.85	0.77	0.77
		90.00	10.00	0.67	0.87	0.77	0.77
		47.50	2.50	0.67	0.91	0.77	0.77
		95.00	5.00	0.67	0.92	0.77	0.77
11	1	45.00	5.00	0.69	0.86	0.79	0.78
		90.00	10.00	0.69	0.87	0.79	0.78
		47.50	2.50	0.69	0.91	0.86	0.78
		95.00	5.00	0.69	0.92	0.87	0.78
12	1	45.00	5.00	0.72	0.86	0.79	0.79
		90.00	10.00	0.72	0.87	0.79	0.79
		47.50	2.50	0.72	0.91	0.86	0.79
		95.00	5.00	0.72	0.92	0.87	0.79

TRIAL NUMBER	TRIAL RESULT	A	B	CCL10	BCL10	K=5 WCL10	K=10 WCL10
13	1	45.00	5.00	0.74	0.86	0.80	0.81
		90.00	10.00	0.74	0.87	0.79	0.81
		47.50	2.50	0.74	0.91	0.86	0.81
		95.00	5.00	0.74	0.92	0.87	0.81
14	1	45.00	5.00	0.75	0.86	0.80	0.82
		90.00	10.00	0.75	0.87	0.80	0.82
		47.50	2.50	0.75	0.91	0.87	0.82
		95.00	5.00	0.75	0.92	0.87	0.82
15	1	45.00	5.00	0.77	0.87	0.80	0.82
		90.00	10.00	0.77	0.87	0.80	0.82
		47.50	2.50	0.77	0.91	0.87	0.82
		95.00	5.00	0.77	0.93	0.87	0.82
16	1	45.00	5.00	0.78	0.87	0.86	0.81
		90.00	10.00	0.78	0.87	0.87	0.80
		47.50	2.50	0.78	0.92	0.91	0.87
		95.00	5.00	0.78	0.93	0.92	0.88
17	0	45.00	5.00	0.72	0.85	0.81	0.81
		90.00	10.00	0.72	0.87	0.81	0.81
		47.50	2.50	0.72	0.90	0.81	0.81
		95.00	5.00	0.72	0.92	0.81	0.81
18	1	45.00	5.00	0.74	0.85	0.82	0.82
		90.00	10.00	0.74	0.87	0.82	0.82
		47.50	2.50	0.74	0.90	0.82	0.82
		95.00	5.00	0.74	0.92	0.82	0.82
19	0	45.00	5.00	0.69	0.84	0.77	0.77
		90.00	10.00	0.69	0.86	0.77	0.77
		47.50	2.50	0.69	0.88	0.77	0.77
		95.00	5.00	0.69	0.91	0.77	0.77
20	1	45.00	5.00	0.70	0.84	0.77	0.77
		90.00	10.00	0.70	0.86	0.77	0.77
		47.50	2.50	0.70	0.88	0.77	0.77
		95.00	5.00	0.70	0.91	0.77	0.77
21	1	45.00	5.00	0.71	0.84	0.78	0.78
		90.00	10.00	0.71	0.86	0.78	0.78
		47.50	2.50	0.71	0.89	0.78	0.78
		95.00	5.00	0.71	0.91	0.78	0.78
22	1	45.00	5.00	0.73	0.84	0.79	0.79
		90.00	10.00	0.73	0.86	0.79	0.79
		47.50	2.50	0.73	0.89	0.79	0.79
		95.00	5.00	0.73	0.91	0.79	0.79
23	1	45.00	5.00	0.74	0.85	0.79	0.79
		90.00	10.00	0.74	0.86	0.79	0.79
		47.50	2.50	0.74	0.89	0.79	0.79
		95.00	5.00	0.74	0.91	0.79	0.79
24	1	45.00	5.00	0.75	0.85	0.81	0.80
		90.00	10.00	0.75	0.86	0.81	0.80
		47.50	2.50	0.75	0.89	0.86	0.80
		95.00	5.00	0.75	0.91	0.87	0.80
25	1	45.00	5.00	0.76	0.85	0.82	0.80
		90.00	10.00	0.76	0.87	0.81	0.80
		47.50	2.50	0.76	0.89	0.86	0.80
		95.00	5.00	0.76	0.91	0.87	0.80
26	1	45.00	5.00	0.77	0.85	0.82	0.80
		90.00	10.00	0.77	0.87	0.81	0.80
		47.50	2.50	0.77	0.89	0.86	0.80
		95.00	5.00	0.77	0.91	0.87	0.80

TRIAL NUMBER	TRIAL RESULT	A	B	CCL10	BCL10	K=5 WCL10	K=10 WCL10
27	1	45.00	5.00	0.77	0.86	0.82	0.81
		90.00	10.00	0.77	0.87	0.81	0.81
		47.50	2.50	0.77	0.89	0.87	0.81
		95.00	5.00	0.77	0.91	0.87	0.81
28	1	45.00	5.00	0.78	0.86	0.82	0.81
		90.00	10.00	0.78	0.87	0.81	0.81
		47.50	2.50	0.78	0.90	0.87	0.81
		95.00	5.00	0.78	0.91	0.87	0.81
29	0	45.00	5.00	0.75	0.84	0.81	0.81
		90.00	10.00	0.75	0.86	0.81	0.81
		47.50	2.50	0.75	0.88	0.81	0.81
		95.00	5.00	0.75	0.91	0.81	0.81
30	1	45.00	5.00	0.76	0.85	0.81	0.81
		90.00	10.00	0.76	0.86	0.81	0.81
		47.50	2.50	0.76	0.88	0.81	0.81
		95.00	5.00	0.76	0.91	0.91	0.81
31	1	45.00	5.00	0.76	0.85	0.81	0.81
		90.00	10.00	0.76	0.86	0.81	0.81
		47.50	2.50	0.76	0.88	0.81	0.81
		95.00	5.00	0.76	0.91	0.81	0.81
32	1	45.00	5.00	0.77	0.85	0.82	0.82
		90.00	10.00	0.77	0.86	0.82	0.82
		47.50	2.50	0.77	0.89	0.82	0.82
		95.00	5.00	0.77	0.91	0.82	0.82
33	1	45.00	5.00	0.78	0.85	0.82	0.82
		90.00	10.00	0.78	0.86	0.82	0.82
		47.50	2.50	0.78	0.89	0.82	0.82
		95.00	5.00	0.78	0.91	0.82	0.82
34	1	45.00	5.00	0.78	0.85	0.83	0.82
		90.00	10.00	0.78	0.87	0.82	0.82
		47.50	2.50	0.78	0.89	0.87	0.82
		95.00	5.00	0.78	0.91	0.88	0.82
35	1	45.00	5.00	0.79	0.86	0.84	0.83
		90.00	10.00	0.79	0.87	0.82	0.83
		47.50	2.50	0.79	0.89	0.87	0.83
		95.00	5.00	0.79	0.91	0.88	0.83
36	1	45.00	5.00	0.80	0.86	0.84	0.83
		90.00	10.00	0.80	0.87	0.83	0.83
		47.50	2.50	0.80	0.89	0.87	0.83
		95.00	5.00	0.80	0.91	0.88	0.83
37	1	45.00	5.00	0.80	0.86	0.84	0.83
		90.00	10.00	0.80	0.87	0.83	0.83
		47.50	2.50	0.80	0.89	0.88	0.83
		95.00	5.00	0.80	0.91	0.88	0.83
38	1	45.00	5.00	0.81	0.86	0.84	0.83
		90.00	10.00	0.81	0.87	0.83	0.83
		47.50	2.50	0.81	0.89	0.88	0.83
		95.00	5.00	0.81	0.91	0.88	0.83
39	1	45.00	5.00	0.81	0.86	0.86	0.84
		90.00	10.00	0.81	0.87	0.87	0.83
		47.50	2.50	0.81	0.90	0.88	0.88
		95.00	5.00	0.81	0.91	0.90	0.88
40	1	45.00	5.00	0.82	0.86	0.86	0.85
		90.00	10.00	0.82	0.87	0.87	0.83
		47.50	2.50	0.82	0.90	0.88	0.88
		95.00	5.00	0.82	0.91	0.90	0.88

TRIAL NUMBER	TRIAL RESULT	A	B	CCL10	BCL10	K=5 WCL10	K=10 WCL10
41	1	45.00	5.00	0.82	0.86	0.86	0.85
		90.00	10.00	0.82	0.87	0.87	0.83
		47.50	2.50	0.82	0.90	0.89	0.88
		95.00	5.00	0.82	0.91	0.90	0.88
42	1	45.00	5.00	0.82	0.87	0.86	0.85
		90.00	10.00	0.82	0.87	0.87	0.84
		47.50	2.50	0.82	0.90	0.89	0.88
		95.00	5.00	0.82	0.92	0.90	0.89
43	1	45.00	5.00	0.83	0.87	0.86	0.85
		90.00	10.00	0.83	0.87	0.87	0.84
		47.50	2.50	0.83	0.90	0.89	0.89
		95.00	5.00	0.83	0.92	0.91	0.89
44	1	45.00	5.00	0.83	0.87	0.87	0.85
		90.00	10.00	0.83	0.88	0.87	0.84
		47.50	2.50	0.83	0.90	0.90	0.89
		95.00	5.00	0.83	0.92	0.91	0.89
45	1	45.00	5.00	0.84	0.87	0.87	0.86
		90.00	10.00	0.84	0.88	0.87	0.84
		47.50	2.50	0.84	0.90	0.90	0.89
		95.00	5.00	0.84	0.92	0.91	0.89
46	1	45.00	5.00	0.84	0.87	0.87	0.86
		90.00	10.00	0.84	0.88	0.88	0.84
		47.50	2.50	0.84	0.90	0.90	0.89
		95.00	5.00	0.84	0.92	0.91	0.89
47	1	45.00	5.00	0.84	0.87	0.87	0.86
		90.00	10.00	0.84	0.88	0.88	0.84
		47.50	2.50	0.84	0.90	0.90	0.89
		95.00	5.00	0.84	0.92	0.91	0.89
48	1	45.00	5.00	0.85	0.87	0.87	0.86
		90.00	10.00	0.85	0.88	0.88	0.84
		47.50	2.50	0.85	0.91	0.90	0.89
		95.00	5.00	0.85	0.92	0.91	0.89
49	1	45.00	5.00	0.85	0.88	0.88	0.87
		90.00	10.00	0.85	0.88	0.88	0.88
		47.50	2.50	0.85	0.91	0.90	0.90
		95.00	5.00	0.85	0.92	0.92	0.91
50	0	45.00	5.00	0.83	0.87	0.87	0.87
		90.00	10.00	0.83	0.87	0.87	0.87
		47.50	2.50	0.83	0.90	0.87	0.87
		95.00	5.00	0.83	0.91	0.87	0.87

SIGNIFICANCE LEVEL = .10

SEQUENCE NUMBER 3

UNDERLYING RELIABILITIES 0.80 0.90 0.95 0.95 0.95

TRIAL NUMBER	TRIAL RESULT	A	B	CCL10	BCL10	K-5 WCL10	K-10 WCL10
1	0	45.00	5.00	0.00	0.83	0.00	0.00
		90.00	10.00	0.00	0.86	0.00	0.00
		47.50	2.50	0.00	0.89	0.00	0.00
		95.00	5.00	0.00	0.91	0.00	0.00
2	1	45.00	5.00	0.06	0.83	0.06	0.06
		90.00	10.00	0.06	0.86	0.06	0.06
		47.50	2.50	0.06	0.89	0.06	0.06
		95.00	5.00	0.06	0.92	0.06	0.06
3	1	45.00	5.00	0.20	0.83	0.20	0.20
		90.00	10.00	0.20	0.86	0.20	0.20
		47.50	2.50	0.20	0.89	0.20	0.20
		95.00	5.00	0.20	0.92	0.20	0.20
4	1	45.00	5.00	0.33	0.84	0.33	0.33
		90.00	10.00	0.33	0.86	0.33	0.33
		47.50	2.50	0.33	0.90	0.33	0.33
		95.00	5.00	0.33	0.92	0.33	0.33
5	0	45.00	5.00	0.25	0.82	0.41	0.41
		90.00	10.00	0.25	0.85	0.41	0.41
		47.50	2.50	0.25	0.87	0.41	0.41
		95.00	5.00	0.25	0.91	0.41	0.41
6	1	45.00	5.00	0.34	0.82	0.45	0.45
		90.00	10.00	0.34	0.85	0.45	0.45
		47.50	2.50	0.34	0.88	0.45	0.45
		95.00	5.00	0.34	0.91	0.45	0.45
7	1	45.00	5.00	0.41	0.82	0.49	0.49
		90.00	10.00	0.41	0.85	0.49	0.49
		47.50	2.50	0.41	0.88	0.49	0.49
		95.00	5.00	0.41	0.91	0.49	0.49
8	1	45.00	5.00	0.47	0.83	0.53	0.53
		90.00	10.00	0.47	0.85	0.53	0.53
		47.50	2.50	0.47	0.88	0.53	0.53
		95.00	5.00	0.47	0.91	0.53	0.53
9	1	45.00	5.00	0.51	0.83	0.56	0.56
		90.00	10.00	0.51	0.86	0.56	0.56
		47.50	2.50	0.51	0.88	0.56	0.56
		95.00	5.00	0.51	0.91	0.56	0.56
10	1	45.00	5.00	0.56	0.83	0.74	0.59
		90.00	10.00	0.56	0.86	0.76	0.59
		47.50	2.50	0.56	0.88	0.82	0.59
		95.00	5.00	0.56	0.91	0.84	0.59
11	1	45.00	5.00	0.59	0.84	0.75	0.61
		90.00	10.00	0.59	0.86	0.77	0.61
		47.50	2.50	0.59	0.89	0.82	0.61
		95.00	5.00	0.59	0.91	0.85	0.61
12	1	45.00	5.00	0.62	0.84	0.76	0.63
		90.00	10.00	0.62	0.86	0.77	0.63
		47.50	2.50	0.62	0.89	0.82	0.63
		95.00	5.00	0.62	0.91	0.85	0.63

TRIAL NUMBER	TRIAL RESULT	A	B	CCL10	BCL10	K=5 WCL10	K=10 WCL10
13	1	45.00	5.00	0.65	0.84	0.76	0.65
		90.00	10.00	0.65	0.86	0.77	0.65
		47.50	2.50	0.65	0.89	0.83	0.65
		95.00	5.00	0.65	0.91	0.85	0.65
14	1	45.00	5.00	0.67	0.84	0.77	0.67
		90.00	10.00	0.67	0.86	0.78	0.67
		47.50	2.50	0.67	0.89	0.83	0.67
		95.00	5.00	0.67	0.91	0.85	0.67
15	1	45.00	5.00	0.69	0.85	0.83	0.77
		90.00	10.00	0.69	0.86	0.85	0.78
		47.50	2.50	0.69	0.89	0.87	0.84
		95.00	5.00	0.69	0.91	0.90	0.86
16	1	45.00	5.00	0.71	0.85	0.83	0.78
		90.00	10.00	0.71	0.86	0.85	0.78
		47.50	2.50	0.71	0.90	0.88	0.84
		95.00	5.00	0.71	0.92	0.90	0.86
17	1	45.00	5.00	0.72	0.85	0.84	0.78
		90.00	10.00	0.72	0.87	0.86	0.79
		47.50	2.50	0.72	0.90	0.88	0.84
		95.00	5.00	0.72	0.92	0.90	0.86
18	1	45.00	5.00	0.74	0.85	0.84	0.79
		90.00	10.00	0.74	0.87	0.86	0.79
		47.50	2.50	0.74	0.90	0.88	0.85
		95.00	5.00	0.74	0.92	0.90	0.86
19	1	45.00	5.00	0.75	0.86	0.84	0.79
		90.00	10.00	0.75	0.87	0.86	0.79
		47.50	2.50	0.75	0.90	0.88	0.85
		95.00	5.00	0.75	0.92	0.91	0.86
20	1	45.00	5.00	0.76	0.86	0.85	0.80
		90.00	10.00	0.76	0.87	0.87	0.79
		47.50	2.50	0.76	0.90	0.89	0.85
		95.00	5.00	0.76	0.92	0.91	0.87
21	1	45.00	5.00	0.77	0.86	0.85	0.80
		90.00	10.00	0.77	0.87	0.87	0.80
		47.50	2.50	0.77	0.90	0.90	0.86
		95.00	5.00	0.77	0.92	0.91	0.87
22	1	45.00	5.00	0.78	0.86	0.86	0.80
		90.00	10.00	0.78	0.87	0.87	0.80
		47.50	2.50	0.78	0.90	0.90	0.86
		95.00	5.00	0.78	0.92	0.91	0.87
23	1	45.00	5.00	0.79	0.86	0.86	0.81
		90.00	10.00	0.79	0.87	0.87	0.80
		47.50	2.50	0.79	0.91	0.90	0.86
		95.00	5.00	0.79	0.92	0.92	0.87
24	1	45.00	5.00	0.80	0.87	0.86	0.81
		90.00	10.00	0.80	0.87	0.87	0.80
		47.50	2.50	0.80	0.91	0.90	0.87
		95.00	5.00	0.80	0.92	0.92	0.87
25	0	45.00	5.00	0.76	0.85	0.82	0.82
		90.00	10.00	0.76	0.87	0.82	0.82
		47.50	2.50	0.76	0.89	0.82	0.82
		95.00	5.00	0.76	0.91	0.82	0.82
26	1	45.00	5.00	0.77	0.85	0.83	0.83
		90.00	10.00	0.77	0.87	0.83	0.83
		47.50	2.50	0.77	0.89	0.83	0.83
		95.00	5.00	0.77	0.91	0.83	0.83

TRIAL NUMBER	TRIAL RESULT	A	B	CCL10	BCL10	K=5 WCL10	K=10 WCL10
27	1	45.00	5.00	0.77	0.86	0.83	0.83
		90.00	10.00	0.77	0.87	0.83	0.83
		47.50	2.50	0.77	0.89	0.83	0.83
		95.00	5.00	0.77	0.91	0.83	0.83
28	1	45.00	5.00	0.78	0.86	0.83	0.83
		90.00	10.00	0.78	0.87	0.83	0.83
		47.50	2.50	0.78	0.90	0.83	0.83
		95.00	5.00	0.78	0.91	0.83	0.83
29	1	45.00	5.00	0.79	0.86	0.84	0.84
		90.00	10.00	0.79	0.87	0.84	0.84
		47.50	2.50	0.79	0.90	0.84	0.84
		95.00	5.00	0.79	0.92	0.84	0.84
30	1	45.00	5.00	0.80	0.86	0.84	0.84
		90.00	10.00	0.80	0.87	0.82	0.84
		47.50	2.50	0.80	0.90	0.88	0.84
		95.00	5.00	0.80	0.92	0.88	0.84
31	1	45.00	5.00	0.80	0.86	0.84	0.84
		90.00	10.00	0.80	0.87	0.83	0.84
		47.50	2.50	0.80	0.90	0.88	0.84
		95.00	5.00	0.80	0.92	0.88	0.84
32	1	45.00	5.00	0.81	0.86	0.84	0.85
		90.00	10.00	0.81	0.87	0.83	0.85
		47.50	2.50	0.81	0.90	0.88	0.85
		95.00	5.00	0.81	0.92	0.88	0.85
33	1	45.00	5.00	0.81	0.87	0.84	0.85
		90.00	10.00	0.81	0.87	0.83	0.85
		47.50	2.50	0.81	0.90	0.88	0.85
		95.00	5.00	0.81	0.92	0.89	0.85
34	1	45.00	5.00	0.82	0.87	0.85	0.85
		90.00	10.00	0.82	0.87	0.83	0.85
		47.50	2.50	0.82	0.90	0.89	0.85
		95.00	5.00	0.82	0.92	0.89	0.85
35	1	45.00	5.00	0.82	0.87	0.87	0.85
		90.00	10.00	0.82	0.88	0.87	0.83
		47.50	2.50	0.82	0.90	0.90	0.89
		95.00	5.00	0.82	0.92	0.91	0.89
36	1	45.00	5.00	0.83	0.87	0.87	0.85
		90.00	10.00	0.83	0.88	0.87	0.83
		47.50	2.50	0.83	0.91	0.90	0.89
		95.00	5.00	0.83	0.92	0.91	0.89
37	1	45.00	5.00	0.83	0.87	0.87	0.85
		90.00	10.00	0.83	0.88	0.87	0.84
		47.50	2.50	0.83	0.91	0.90	0.89
		95.00	5.00	0.83	0.92	0.91	0.89
38	1	45.00	5.00	0.84	0.87	0.87	0.85
		90.00	10.00	0.84	0.88	0.88	0.84
		47.50	2.50	0.84	0.91	0.90	0.89
		95.00	5.00	0.84	0.92	0.91	0.89
39	1	45.00	5.00	0.84	0.88	0.87	0.86
		90.00	10.00	0.84	0.88	0.88	0.84
		47.50	2.50	0.84	0.91	0.90	0.89
		95.00	5.00	0.84	0.92	0.91	0.89
40	1	45.00	5.00	0.85	0.88	0.88	0.86
		90.00	10.00	0.85	0.88	0.88	0.84
		47.50	2.50	0.85	0.91	0.91	0.89
		95.00	5.00	0.85	0.92	0.92	0.89

TRIAL NUMBER	TRIAL RESULT	A	B	CCL10	BCL10	K=5 WCL10	K=10 WCL10
41	1	45.00	5.00	0.85	0.88	0.88	0.86
		90.00	10.00	0.85	0.89	0.88	0.84
		47.50	2.50	0.85	0.91	0.91	0.90
		95.00	5.00	0.85	0.92	0.92	0.89
42	1	45.00	5.00	0.85	0.88	0.88	0.86
		90.00	10.00	0.85	0.88	0.88	0.84
		47.50	2.50	0.85	0.91	0.91	0.90
		95.00	5.00	0.85	0.92	0.92	0.90
43	1	45.00	5.00	0.86	0.88	0.88	0.86
		90.00	10.00	0.86	0.88	0.88	0.84
		47.50	2.50	0.86	0.91	0.91	0.90
		95.00	5.00	0.86	0.92	0.92	0.90
44	1	45.00	5.00	0.86	0.88	0.88	0.86
		90.00	10.00	0.86	0.88	0.88	0.85
		47.50	2.50	0.86	0.91	0.91	0.90
		95.00	5.00	0.86	0.93	0.92	0.90
45	1	45.00	5.00	0.86	0.88	0.88	0.88
		90.00	10.00	0.86	0.88	0.88	0.88
		47.50	2.50	0.86	0.92	0.91	0.91
		95.00	5.00	0.86	0.93	0.92	0.92
46	1	45.00	5.00	0.87	0.88	0.88	0.88
		90.00	10.00	0.87	0.89	0.88	0.88
		47.50	2.50	0.87	0.92	0.91	0.91
		95.00	5.00	0.87	0.93	0.92	0.92
47	1	45.00	5.00	0.87	0.89	0.89	0.88
		90.00	10.00	0.87	0.88	0.89	0.88
		47.50	2.50	0.87	0.92	0.92	0.91
		95.00	5.00	0.87	0.93	0.93	0.92
48	0	45.00	5.00	0.85	0.87	0.88	0.88
		90.00	10.00	0.85	0.88	0.88	0.89
		47.50	2.50	0.85	0.91	0.88	0.88
		95.00	5.00	0.85	0.92	0.88	0.88
49	1	45.00	5.00	0.85	0.89	0.89	0.89
		90.00	10.00	0.85	0.88	0.89	0.89
		47.50	2.50	0.85	0.91	0.89	0.89
		95.00	5.00	0.85	0.92	0.89	0.89
50	1	45.00	5.00	0.85	0.88	0.89	0.89
		90.00	10.00	0.85	0.88	0.89	0.89
		47.50	2.50	0.85	0.91	0.89	0.89
		95.00	5.00	0.85	0.92	0.89	0.89
51	1	45.00	5.00	0.85	0.88	0.89	0.89
		90.00	10.00	0.85	0.88	0.89	0.89
		47.50	2.50	0.85	0.91	0.89	0.89
		95.00	5.00	0.85	0.92	0.89	0.89
52	1	45.00	5.00	0.86	0.88	0.89	0.89
		90.00	10.00	0.86	0.88	0.89	0.89
		47.50	2.50	0.86	0.91	0.89	0.89
		95.00	5.00	0.86	0.92	0.89	0.89
53	1	45.00	5.00	0.86	0.88	0.88	0.89
		90.00	10.00	0.86	0.88	0.86	0.89
		47.50	2.50	0.86	0.91	0.91	0.89
		95.00	5.00	0.86	0.92	0.90	0.89
54	0	45.00	5.00	0.84	0.87	0.88	0.89
		90.00	10.00	0.84	0.88	0.88	0.88
		47.50	2.50	0.84	0.90	0.88	0.88
		95.00	5.00	0.84	0.91	0.88	0.88

SIGNIFICANCE LEVEL = .20

SEQUENCE NUMBER 1

UNDERLYING RELIABILITIES 0.50 0.50 0.50 0.80 0.80

TRIAL NUMBER	TRIAL RESULT	A	B	CCL20	BCL20	K=5 WCL20	K=10 WCL20
1	0	45.00	5.00	0.00	0.85	0.00	0.00
		90.00	10.00	0.00	0.87	0.00	0.00
		47.50	2.50	0.00	0.91	0.00	0.00
		95.00	5.00	0.00	0.93	0.00	0.00
2	1	45.00	5.00	0.11	0.85	0.11	0.11
		90.00	10.00	0.11	0.87	0.11	0.11
		47.50	2.50	0.11	0.91	0.11	0.11
		95.00	5.00	0.11	0.93	0.11	0.11
3	1	45.00	5.00	0.29	0.86	0.29	0.29
		90.00	10.00	0.29	0.87	0.29	0.29
		47.50	2.50	0.29	0.91	0.29	0.29
		95.00	5.00	0.29	0.93	0.29	0.29
4	0	45.00	5.00	0.22	0.84	0.36	0.36
		90.00	10.00	0.22	0.86	0.36	0.36
		47.50	2.50	0.22	0.89	0.36	0.36
		95.00	5.00	0.22	0.92	0.36	0.36
5	1	45.00	5.00	0.33	0.84	0.42	0.42
		90.00	10.00	0.33	0.87	0.42	0.42
		47.50	2.50	0.33	0.89	0.42	0.42
		95.00	5.00	0.33	0.92	0.42	0.42
6	1	45.00	5.00	0.42	0.84	0.48	0.48
		90.00	10.00	0.42	0.87	0.48	0.48
		47.50	2.50	0.42	0.90	0.48	0.48
		95.00	5.00	0.42	0.92	0.48	0.48
7	0	45.00	5.00	0.36	0.83	0.47	0.47
		90.00	10.00	0.36	0.86	0.47	0.47
		47.50	2.50	0.36	0.88	0.47	0.47
		95.00	5.00	0.36	0.91	0.47	0.47
8	1	45.00	5.00	0.42	0.83	0.50	0.50
		90.00	10.00	0.42	0.86	0.50	0.50
		47.50	2.50	0.42	0.88	0.50	0.50
		95.00	5.00	0.42	0.91	0.50	0.50
9	1	45.00	5.00	0.48	0.83	0.53	0.53
		90.00	10.00	0.48	0.86	0.53	0.53
		47.50	2.50	0.48	0.88	0.53	0.53
		95.00	5.00	0.48	0.91	0.53	0.53
10	1	45.00	5.00	0.52	0.84	0.56	0.56
		90.00	10.00	0.52	0.86	0.56	0.56
		47.50	2.50	0.52	0.88	0.56	0.56
		95.00	5.00	0.52	0.91	0.56	0.56
11	1	45.00	5.00	0.56	0.84	0.58	0.58
		90.00	10.00	0.56	0.86	0.58	0.58
		47.50	2.50	0.56	0.89	0.58	0.58
		95.00	5.00	0.56	0.91	0.58	0.58
12	1	45.00	5.00	0.59	0.84	0.76	0.60
		90.00	10.00	0.59	0.86	0.78	0.60
		47.50	2.50	0.59	0.89	0.83	0.60
		95.00	5.00	0.59	0.91	0.85	0.60

TRIAL NUMBER	TRIAL RESULT	A	B	CCL20	BCL20	K=5 WCL20	K=10 WCL20
13	1	45.00	5.00	0.62	0.84	0.77	0.62
		90.00	10.00	0.62	0.87	0.78	0.62
		47.50	2.50	0.62	0.89	0.83	0.62
		95.00	5.00	0.62	0.92	0.85	0.62
14	0	45.00	5.00	0.57	0.83	0.65	0.65
		90.00	10.00	0.57	0.86	0.65	0.65
		47.50	2.50	0.57	0.87	0.65	0.65
		95.00	5.00	0.57	0.91	0.65	0.65
15	1	45.00	5.00	0.60	0.83	0.66	0.66
		90.00	10.00	0.60	0.86	0.66	0.66
		47.50	2.50	0.60	0.88	0.66	0.66
		95.00	5.00	0.60	0.91	0.66	0.66
16	1	45.00	5.00	0.62	0.83	0.67	0.67
		90.00	10.00	0.62	0.86	0.67	0.67
		47.50	2.50	0.62	0.88	0.67	0.67
		95.00	5.00	0.62	0.91	0.67	0.67
17	1	45.00	5.00	0.64	0.84	0.68	0.68
		90.00	10.00	0.64	0.86	0.68	0.68
		47.50	2.50	0.64	0.88	0.68	0.68
		95.00	5.00	0.64	0.91	0.68	0.68
18	0	45.00	5.00	0.60	0.82	0.67	0.67
		90.00	10.00	0.60	0.85	0.67	0.67
		47.50	2.50	0.60	0.86	0.67	0.67
		95.00	5.00	0.60	0.90	0.67	0.67

SIGNIFICANCE LEVEL = .20

SEQUENCE NUMBER 2

UNDERLYING RELIABILITIES 0.70 0.70 0.90 0.90 0.90

TRIAL NUMBER	TRIAL RESULT	A	B	CCL20	BCL20	K=5 WCL20	K=10 WCL20
1	1	45.00	5.00	0.21	0.87	0.87	0.87
		90.00	10.00	0.21	0.88	0.88	0.88
		47.50	2.50	0.21	0.93	0.93	0.93
		95.00	5.00	0.21	0.94	0.94	0.94
2	1	45.00	5.00	0.45	0.88	0.88	0.88
		90.00	10.00	0.45	0.88	0.88	0.88
		47.50	2.50	0.45	0.94	0.94	0.94
		95.00	5.00	0.45	0.94	0.94	0.94
3	1	45.00	5.00	0.59	0.88	0.88	0.88
		90.00	10.00	0.59	0.88	0.88	0.88
		47.50	2.50	0.59	0.94	0.94	0.94
		95.00	5.00	0.59	0.94	0.94	0.94
4	1	45.00	5.00	0.67	0.88	0.88	0.88
		90.00	10.00	0.67	0.89	0.89	0.89
		47.50	2.50	0.67	0.94	0.94	0.94
		95.00	5.00	0.67	0.94	0.94	0.94
5	1	45.00	5.00	0.73	0.88	0.88	0.88
		90.00	10.00	0.73	0.89	0.89	0.89
		47.50	2.50	0.73	0.94	0.94	0.94
		95.00	5.00	0.73	0.94	0.94	0.94
6	0	45.00	5.00	0.58	0.87	0.76	0.76
		90.00	10.00	0.58	0.88	0.76	0.76
		47.50	2.50	0.58	0.92	0.76	0.76
		95.00	5.00	0.58	0.93	0.76	0.76
7	1	45.00	5.00	0.63	0.87	0.78	0.78
		90.00	10.00	0.63	0.88	0.78	0.78
		47.50	2.50	0.63	0.92	0.78	0.78
		95.00	5.00	0.63	0.93	0.78	0.78
8	1	45.00	5.00	0.67	0.87	0.79	0.79
		90.00	10.00	0.67	0.88	0.79	0.79
		47.50	2.50	0.67	0.92	0.79	0.79
		95.00	5.00	0.67	0.93	0.79	0.79
9	1	45.00	5.00	0.71	0.87	0.81	0.81
		90.00	10.00	0.71	0.88	0.81	0.81
		47.50	2.50	0.71	0.92	0.81	0.81
		95.00	5.00	0.71	0.93	0.81	0.81
10	1	45.00	5.00	0.73	0.87	0.82	0.82
		90.00	10.00	0.73	0.88	0.82	0.82
		47.50	2.50	0.73	0.92	0.82	0.82
		95.00	5.00	0.73	0.93	0.82	0.82
11	1	45.00	5.00	0.76	0.88	0.81	0.83
		90.00	10.00	0.76	0.89	0.81	0.83
		47.50	2.50	0.76	0.93	0.88	0.83
		95.00	5.00	0.76	0.93	0.89	0.83
12	1	45.00	5.00	0.78	0.88	0.82	0.84
		90.00	10.00	0.78	0.88	0.81	0.84
		47.50	2.50	0.78	0.93	0.89	0.84
		95.00	5.00	0.78	0.93	0.89	0.84

TRIAL NUMBER	TRIAL RESULT	A	B	CCL20	BCL20	K=5 WCL20	K=10 WCL20
13	1	45.00	5.00	0.79	0.88	0.82	0.85
		90.00	10.00	0.79	0.89	0.81	0.85
		47.50	2.50	0.79	0.93	0.89	0.85
		95.00	5.00	0.79	0.94	0.89	0.85
14	1	45.00	5.00	0.81	0.88	0.83	0.86
		90.00	10.00	0.81	0.89	0.82	0.86
		47.50	2.50	0.81	0.93	0.89	0.86
		95.00	5.00	0.81	0.94	0.89	0.86
15	1	45.00	5.00	0.82	0.88	0.83	0.86
		90.00	10.00	0.82	0.89	0.82	0.86
		47.50	2.50	0.82	0.93	0.89	0.86
		95.00	5.00	0.82	0.94	0.89	0.86
16	1	45.00	5.00	0.83	0.89	0.88	0.84
		90.00	10.00	0.83	0.89	0.89	0.82
		47.50	2.50	0.83	0.93	0.92	0.90
		95.00	5.00	0.83	0.94	0.93	0.89
17	0	45.00	5.00	0.77	0.87	0.84	0.84
		90.00	10.00	0.77	0.88	0.84	0.84
		47.50	2.50	0.77	0.91	0.84	0.84
		95.00	5.00	0.77	0.93	0.84	0.84
18	1	45.00	5.00	0.78	0.87	0.85	0.85
		90.00	10.00	0.78	0.88	0.85	0.85
		47.50	2.50	0.78	0.92	0.85	0.85
		95.00	5.00	0.78	0.93	0.85	0.85
19	0	45.00	5.00	0.73	0.86	0.80	0.80
		90.00	10.00	0.73	0.87	0.80	0.80
		47.50	2.50	0.73	0.90	0.80	0.80
		95.00	5.00	0.73	0.92	0.80	0.80
20	1	45.00	5.00	0.75	0.86	0.80	0.80
		90.00	10.00	0.75	0.87	0.80	0.80
		47.50	2.50	0.75	0.90	0.80	0.80
		95.00	5.00	0.75	0.92	0.80	0.80
21	1	45.00	5.00	0.76	0.86	0.81	0.81
		90.00	10.00	0.76	0.87	0.81	0.81
		47.50	2.50	0.76	0.90	0.81	0.81
		95.00	5.00	0.76	0.92	0.81	0.81
22	1	45.00	5.00	0.77	0.86	0.81	0.81
		90.00	10.00	0.77	0.88	0.81	0.81
		47.50	2.50	0.77	0.90	0.81	0.81
		95.00	5.00	0.77	0.92	0.81	0.81
23	1	45.00	5.00	0.78	0.87	0.82	0.82
		90.00	10.00	0.78	0.88	0.82	0.82
		47.50	2.50	0.78	0.91	0.82	0.82
		95.00	5.00	0.78	0.92	0.82	0.82
24	1	45.00	5.00	0.79	0.87	0.84	0.82
		90.00	10.00	0.79	0.88	0.82	0.82
		47.50	2.50	0.79	0.91	0.88	0.82
		95.00	5.00	0.79	0.92	0.89	0.82
25	1	45.00	5.00	0.80	0.87	0.84	0.83
		90.00	10.00	0.80	0.88	0.83	0.83
		47.50	2.50	0.80	0.91	0.88	0.83
		95.00	5.00	0.80	0.92	0.89	0.83
26	1	45.00	5.00	0.80	0.87	0.84	0.83
		90.00	10.00	0.80	0.88	0.83	0.83
		47.50	2.50	0.80	0.91	0.88	0.83
		95.00	5.00	0.80	0.92	0.89	0.83

TRIAL NUMBER	TRIAL RESULT	A	B	CCL20	BCL20	K=5 WCL20	K=10 WCL20
27	1	45.00	5.00	0.81	0.87	0.84	0.84
		90.00	10.00	0.81	0.88	0.83	0.84
		47.50	2.50	0.81	0.91	0.88	0.84
		95.00	5.00	0.81	0.93	0.89	0.84
28	1	45.00	5.00	0.82	0.88	0.85	0.84
		90.00	10.00	0.82	0.88	0.83	0.84
		47.50	2.50	0.82	0.91	0.89	0.84
		95.00	5.00	0.82	0.93	0.89	0.84
29	0	45.00	5.00	0.78	0.86	0.83	0.83
		90.00	10.00	0.78	0.87	0.83	0.83
		47.50	2.50	0.78	0.90	0.83	0.83
		95.00	5.00	0.78	0.92	0.83	0.83
30	1	45.00	5.00	0.79	0.86	0.83	0.83
		90.00	10.00	0.79	0.88	0.83	0.83
		47.50	2.50	0.79	0.90	0.83	0.83
		95.00	5.00	0.79	0.92	0.83	0.83
31	1	45.00	5.00	0.80	0.87	0.84	0.84
		90.00	10.00	0.80	0.88	0.84	0.84
		47.50	2.50	0.80	0.90	0.84	0.84
		95.00	5.00	0.80	0.92	0.84	0.84
32	1	45.00	5.00	0.80	0.87	0.84	0.84
		90.00	10.00	0.80	0.88	0.84	0.84
		47.50	2.50	0.80	0.90	0.84	0.84
		95.00	5.00	0.80	0.92	0.84	0.84
33	1	45.00	5.00	0.81	0.87	0.84	0.84
		90.00	10.00	0.81	0.88	0.84	0.84
		47.50	2.50	0.81	0.90	0.84	0.84
		95.00	5.00	0.81	0.92	0.84	0.84
34	1	45.00	5.00	0.82	0.87	0.85	0.84
		90.00	10.00	0.82	0.88	0.84	0.84
		47.50	2.50	0.82	0.90	0.89	0.84
		95.00	5.00	0.82	0.92	0.89	0.84
35	1	45.00	5.00	0.82	0.87	0.85	0.85
		90.00	10.00	0.82	0.88	0.84	0.85
		47.50	2.50	0.82	0.91	0.89	0.85
		95.00	5.00	0.82	0.92	0.89	0.85
36	1	45.00	5.00	0.83	0.87	0.86	0.85
		90.00	10.00	0.83	0.88	0.84	0.85
		47.50	2.50	0.83	0.91	0.89	0.85
		95.00	5.00	0.83	0.92	0.89	0.85
37	1	45.00	5.00	0.83	0.88	0.86	0.85
		90.00	10.00	0.83	0.88	0.84	0.85
		47.50	2.50	0.83	0.91	0.89	0.85
		95.00	5.00	0.83	0.92	0.89	0.85
38	1	45.00	5.00	0.83	0.88	0.86	0.85
		90.00	10.00	0.83	0.88	0.85	0.85
		47.50	2.50	0.83	0.91	0.90	0.85
		95.00	5.00	0.83	0.92	0.90	0.85
39	1	45.00	5.00	0.84	0.88	0.87	0.86
		90.00	10.00	0.84	0.88	0.88	0.85
		47.50	2.50	0.84	0.91	0.90	0.90
		95.00	5.00	0.84	0.92	0.91	0.90
40	1	45.00	5.00	0.84	0.88	0.88	0.86
		90.00	10.00	0.84	0.88	0.88	0.85
		47.50	2.50	0.84	0.91	0.90	0.90
		95.00	5.00	0.84	0.92	0.91	0.90

TRIAL NUMBER	TRIAL RESULT	A	B	CCL20	BCL20	K=5 WCL20	K=10 WCL20
41	1	45.00	5.00	0.85	0.88	0.88	0.87
		90.00	10.00	0.85	0.89	0.88	0.85
		47.50	2.50	0.85	0.91	0.90	0.90
		95.00	5.00	0.85	0.92	0.92	0.90
42	1	45.00	5.00	0.85	0.88	0.88	0.87
		90.00	10.00	0.85	0.89	0.88	0.85
		47.50	2.50	0.85	0.91	0.90	0.90
		95.00	5.00	0.85	0.93	0.92	0.90
43	1	45.00	5.00	0.85	0.88	0.88	0.87
		90.00	10.00	0.85	0.89	0.88	0.85
		47.50	2.50	0.85	0.91	0.90	0.90
		95.00	5.00	0.85	0.93	0.92	0.90
44	1	45.00	5.00	0.86	0.88	0.88	0.87
		90.00	10.00	0.86	0.89	0.89	0.85
		47.50	2.50	0.86	0.92	0.91	0.90
		95.00	5.00	0.86	0.93	0.92	0.90
45	1	45.00	5.00	0.86	0.89	0.88	0.87
		90.00	10.00	0.86	0.89	0.89	0.86
		47.50	2.50	0.86	0.92	0.91	0.90
		95.00	5.00	0.86	0.93	0.92	0.90
46	1	45.00	5.00	0.86	0.89	0.89	0.87
		90.00	10.00	0.86	0.89	0.89	0.86
		47.50	2.50	0.86	0.92	0.91	0.91
		95.00	5.00	0.86	0.93	0.92	0.90
47	1	45.00	5.00	0.87	0.89	0.89	0.88
		90.00	10.00	0.87	0.89	0.89	0.86
		47.50	2.50	0.87	0.92	0.91	0.91
		95.00	5.00	0.87	0.93	0.92	0.90
48	1	45.00	5.00	0.87	0.89	0.89	0.88
		90.00	10.00	0.87	0.89	0.89	0.86
		47.50	2.50	0.87	0.92	0.91	0.91
		95.00	5.00	0.87	0.93	0.92	0.91
49	1	45.00	5.00	0.87	0.89	0.89	0.89
		90.00	10.00	0.87	0.89	0.89	0.89
		47.50	2.50	0.87	0.92	0.92	0.91
		95.00	5.00	0.87	0.93	0.93	0.92
50	0	45.00	5.00	0.85	0.88	0.88	0.88
		90.00	10.00	0.85	0.89	0.88	0.88
		47.50	2.50	0.85	0.91	0.88	0.88
		95.00	5.00	0.85	0.92	0.88	0.88

SIGNIFICANCE LEVEL = .20

SEQUENCE NUMBER 3

UNDERLYING RELIABILITIES 0.80 0.90 0.95 0.95 0.95

TRIAL NUMBER	TRIAL RESULT	A	B	CCL20	BCL20	K=5 WCL20	K=10 WCL20
1	0	45.00	5.00	0.00	0.85	0.00	0.00
		90.00	10.00	0.00	0.87	0.00	0.00
		47.50	2.50	0.00	0.91	0.00	0.00
		95.00	5.00	0.00	0.93	0.00	0.00
2	1	45.00	5.00	0.11	0.85	0.11	0.11
		90.00	10.00	0.11	0.87	0.11	0.11
		47.50	2.50	0.11	0.91	0.11	0.11
		95.00	5.00	0.11	0.93	0.11	0.11
3	1	45.00	5.00	0.29	0.86	0.29	0.29
		90.00	10.00	0.29	0.87	0.29	0.29
		47.50	2.50	0.29	0.91	0.29	0.29
		95.00	5.00	0.29	0.93	0.29	0.29
4	1	45.00	5.00	0.42	0.86	0.42	0.42
		90.00	10.00	0.42	0.87	0.42	0.42
		47.50	2.50	0.42	0.91	0.42	0.42
		95.00	5.00	0.42	0.93	0.42	0.42
5	0	45.00	5.00	0.33	0.84	0.48	0.48
		90.00	10.00	0.33	0.87	0.48	0.48
		47.50	2.50	0.33	0.89	0.48	0.48
		95.00	5.00	0.33	0.92	0.48	0.48
6	1	45.00	5.00	0.42	0.86	0.52	0.52
		90.00	10.00	0.42	0.87	0.52	0.52
		47.50	2.50	0.42	0.90	0.52	0.52
		95.00	5.00	0.42	0.92	0.52	0.52
7	1	45.00	5.00	0.49	0.85	0.56	0.56
		90.00	10.00	0.49	0.87	0.56	0.56
		47.50	2.50	0.49	0.90	0.56	0.56
		95.00	5.00	0.49	0.92	0.56	0.56
8	1	45.00	5.00	0.54	0.85	0.59	0.59
		90.00	10.00	0.54	0.87	0.59	0.59
		47.50	2.50	0.54	0.90	0.59	0.59
		95.00	5.00	0.54	0.92	0.59	0.59
9	1	45.00	5.00	0.59	0.85	0.62	0.62
		90.00	10.00	0.59	0.87	0.62	0.62
		47.50	2.50	0.59	0.90	0.62	0.62
		95.00	5.00	0.59	0.92	0.62	0.62
10	1	45.00	5.00	0.62	0.86	0.78	0.65
		90.00	10.00	0.62	0.87	0.79	0.65
		47.50	2.50	0.62	0.90	0.84	0.65
		95.00	5.00	0.62	0.92	0.86	0.65
11	1	45.00	5.00	0.65	0.86	0.78	0.67
		90.00	10.00	0.65	0.87	0.79	0.67
		47.50	2.50	0.65	0.91	0.85	0.67
		95.00	5.00	0.65	0.92	0.87	0.67
12	1	45.00	5.00	0.68	0.86	0.79	0.69
		90.00	10.00	0.68	0.87	0.79	0.69
		47.50	2.50	0.68	0.91	0.85	0.69
		95.00	5.00	0.68	0.92	0.87	0.69

TRIAL NUMBER	TRIAL RESULT	A	B	CCL20	BCL20	K=5 WCL20	K=10 WCL20
13	1	45.00	5.00	0.70	0.86	0.79	0.70
		90.00	10.00	0.70	0.88	0.80	0.70
		47.50	2.50	0.70	0.91	0.85	0.70
		95.00	5.00	0.70	0.93	0.87	0.70
14	1	45.00	5.00	0.72	0.86	0.80	0.72
		90.00	10.00	0.72	0.88	0.80	0.72
		47.50	2.50	0.72	0.91	0.86	0.72
		95.00	5.00	0.72	0.93	0.87	0.72
15	1	45.00	5.00	0.74	0.87	0.85	0.80
		90.00	10.00	0.74	0.88	0.87	0.80
		47.50	2.50	0.74	0.91	0.89	0.86
		95.00	5.00	0.74	0.93	0.92	0.87
16	1	45.00	5.00	0.76	0.87	0.86	0.81
		90.00	10.00	0.76	0.88	0.87	0.80
		47.50	2.50	0.76	0.91	0.90	0.87
		95.00	5.00	0.76	0.93	0.92	0.88
17	1	45.00	5.00	0.77	0.87	0.86	0.81
		90.00	10.00	0.77	0.88	0.87	0.81
		47.50	2.50	0.77	0.91	0.90	0.87
		95.00	5.00	0.77	0.93	0.92	0.88
18	1	45.00	5.00	0.78	0.87	0.86	0.81
		90.00	10.00	0.78	0.88	0.87	0.81
		47.50	2.50	0.78	0.92	0.90	0.87
		95.00	5.00	0.78	0.93	0.92	0.88
19	1	45.00	5.00	0.79	0.87	0.86	0.82
		90.00	10.00	0.79	0.88	0.87	0.81
		47.50	2.50	0.79	0.92	0.90	0.88
		95.00	5.00	0.79	0.93	0.92	0.88
20	1	45.00	5.00	0.80	0.88	0.87	0.82
		90.00	10.00	0.80	0.88	0.88	0.81
		47.50	2.50	0.80	0.92	0.91	0.88
		95.00	5.00	0.80	0.93	0.93	0.88
21	1	45.00	5.00	0.81	0.88	0.87	0.83
		90.00	10.00	0.81	0.88	0.88	0.82
		47.50	2.50	0.81	0.92	0.91	0.88
		95.00	5.00	0.81	0.93	0.93	0.89
22	1	45.00	5.00	0.82	0.88	0.88	0.83
		90.00	10.00	0.82	0.89	0.88	0.82
		47.50	2.50	0.82	0.92	0.91	0.88
		95.00	5.00	0.82	0.93	0.93	0.89
23	1	45.00	5.00	0.83	0.88	0.88	0.83
		90.00	10.00	0.83	0.89	0.88	0.82
		47.50	2.50	0.83	0.92	0.92	0.89
		95.00	5.00	0.83	0.93	0.93	0.89
24	1	45.00	5.00	0.84	0.88	0.88	0.84
		90.00	10.00	0.84	0.89	0.88	0.82
		47.50	2.50	0.84	0.92	0.92	0.89
		95.00	5.00	0.84	0.93	0.93	0.89
25	0	45.00	5.00	0.80	0.87	0.85	0.85
		90.00	10.00	0.80	0.88	0.85	0.85
		47.50	2.50	0.80	0.91	0.85	0.85
		95.00	5.00	0.80	0.92	0.85	0.85
26	1	45.00	5.00	0.80	0.87	0.85	0.85
		90.00	10.00	0.80	0.88	0.85	0.85
		47.50	2.50	0.80	0.91	0.85	0.85
		95.00	5.00	0.80	0.92	0.85	0.85

TRIAL NUMBER	TRIAL RESULT	A	B	CCL20	BCL20	K=5 WCL20	K=10 WCL20
27	1	45.00	5.00	0.81	0.87	0.85	0.85
		90.00	10.00	0.81	0.88	0.85	0.85
		47.50	2.50	0.81	0.91	0.85	0.85
		95.00	5.00	0.81	0.93	0.85	0.85
28	1	45.00	5.00	0.82	0.88	0.86	0.86
		90.00	10.00	0.82	0.88	0.86	0.86
		47.50	2.50	0.82	0.91	0.86	0.86
		95.00	5.00	0.82	0.93	0.86	0.86
29	1	45.00	5.00	0.82	0.88	0.86	0.86
		90.00	10.00	0.82	0.88	0.86	0.86
		47.50	2.50	0.82	0.91	0.86	0.86
		95.00	5.00	0.82	0.93	0.86	0.86
30	1	45.00	5.00	0.83	0.88	0.86	0.86
		90.00	10.00	0.83	0.88	0.84	0.86
		47.50	2.50	0.83	0.91	0.90	0.86
		95.00	5.00	0.83	0.93	0.90	0.86
31	1	45.00	5.00	0.83	0.88	0.86	0.87
		90.00	10.00	0.83	0.88	0.84	0.87
		47.50	2.50	0.83	0.92	0.90	0.87
		95.00	5.00	0.83	0.93	0.90	0.87
32	1	45.00	5.00	0.84	0.88	0.86	0.87
		90.00	10.00	0.84	0.89	0.84	0.87
		47.50	2.50	0.84	0.92	0.90	0.87
		95.00	5.00	0.84	0.93	0.90	0.87
33	1	45.00	5.00	0.84	0.88	0.86	0.87
		90.00	10.00	0.84	0.89	0.85	0.87
		47.50	2.50	0.84	0.92	0.90	0.87
		95.00	5.00	0.84	0.93	0.90	0.87
34	1	45.00	5.00	0.85	0.88	0.87	0.87
		90.00	10.00	0.85	0.89	0.85	0.87
		47.50	2.50	0.85	0.92	0.90	0.87
		95.00	5.00	0.85	0.93	0.90	0.87
35	1	45.00	5.00	0.85	0.89	0.88	0.87
		90.00	10.00	0.85	0.89	0.89	0.85
		47.50	2.50	0.85	0.92	0.91	0.90
		95.00	5.00	0.85	0.93	0.92	0.90
36	1	45.00	5.00	0.86	0.89	0.88	0.87
		90.00	10.00	0.86	0.89	0.89	0.85
		47.50	2.50	0.86	0.92	0.91	0.91
		95.00	5.00	0.86	0.93	0.92	0.90
37	1	45.00	5.00	0.86	0.89	0.89	0.87
		90.00	10.00	0.86	0.89	0.89	0.85
		47.50	2.50	0.86	0.92	0.91	0.91
		95.00	5.00	0.86	0.93	0.92	0.90
38	1	45.00	5.00	0.86	0.89	0.89	0.87
		90.00	10.00	0.86	0.89	0.89	0.85
		47.50	2.50	0.86	0.92	0.91	0.91
		95.00	5.00	0.86	0.93	0.92	0.90
39	1	45.00	5.00	0.87	0.89	0.89	0.87
		90.00	10.00	0.87	0.89	0.89	0.86
		47.50	2.50	0.87	0.92	0.92	0.91
		95.00	5.00	0.87	0.93	0.93	0.91
40	1	45.00	5.00	0.87	0.89	0.89	0.88
		90.00	10.00	0.87	0.89	0.89	0.86
		47.50	2.50	0.87	0.92	0.92	0.91
		95.00	5.00	0.87	0.93	0.93	0.91

TRIAL NUMBER	TRIAL RESULT	A	B	CCL20	BCL20	K=5 WCL20	K=10 WCL20
41	1	45.00	5.00	0.87	0.89	0.89	0.88
		90.00	10.00	0.87	0.89	0.89	0.86
		47.50	2.50	0.87	0.93	0.92	0.91
		95.00	5.00	0.87	0.93	0.93	0.91
42	1	45.00	5.00	0.88	0.89	0.89	0.88
		90.00	10.00	0.88	0.89	0.89	0.86
		47.50	2.50	0.88	0.93	0.92	0.91
		95.00	5.00	0.88	0.93	0.93	0.91
43	1	45.00	5.00	0.88	0.90	0.90	0.88
		90.00	10.00	0.88	0.89	0.89	0.86
		47.50	2.50	0.88	0.93	0.92	0.91
		95.00	5.00	0.88	0.93	0.93	0.91
44	1	45.00	5.00	0.88	0.90	0.90	0.88
		90.00	10.00	0.88	0.90	0.90	0.86
		47.50	2.50	0.88	0.93	0.92	0.92
		95.00	5.00	0.88	0.94	0.93	0.91
45	1	45.00	5.00	0.89	0.90	0.90	0.90
		90.00	10.00	0.89	0.90	0.90	0.90
		47.50	2.50	0.89	0.93	0.93	0.92
		95.00	5.00	0.89	0.94	0.93	0.93
46	1	45.00	5.00	0.89	0.90	0.90	0.90
		90.00	10.00	0.89	0.90	0.90	0.90
		47.50	2.50	0.89	0.93	0.93	0.92
		95.00	5.00	0.89	0.94	0.93	0.93
47	1	45.00	5.00	0.89	0.90	0.90	0.90
		90.00	10.00	0.89	0.90	0.90	0.90
		47.50	2.50	0.89	0.93	0.93	0.92
		95.00	5.00	0.89	0.94	0.94	0.93
48	0	45.00	5.00	0.87	0.89	0.90	0.90
		90.00	10.00	0.87	0.89	0.90	0.90
		47.50	2.50	0.87	0.92	0.90	0.90
		95.00	5.00	0.87	0.93	0.90	0.90
49	1	45.00	5.00	0.87	0.89	0.90	0.90
		90.00	10.00	0.87	0.89	0.90	0.90
		47.50	2.50	0.87	0.92	0.90	0.90
		95.00	5.00	0.87	0.93	0.90	0.90
50	1	45.00	5.00	0.87	0.89	0.90	0.90
		90.00	10.00	0.87	0.89	0.90	0.90
		47.50	2.50	0.87	0.92	0.90	0.90
		95.00	5.00	0.87	0.93	0.90	0.90
51	1	45.00	5.00	0.88	0.89	0.90	0.90
		90.00	10.00	0.88	0.89	0.90	0.90
		47.50	2.50	0.88	0.92	0.90	0.90
		95.00	5.00	0.88	0.93	0.90	0.90
52	1	45.00	5.00	0.88	0.89	0.90	0.90
		90.00	10.00	0.88	0.89	0.90	0.90
		47.50	2.50	0.88	0.92	0.90	0.90
		95.00	5.00	0.88	0.93	0.90	0.90
53	1	45.00	5.00	0.88	0.90	0.89	0.90
		90.00	10.00	0.88	0.89	0.88	0.90
		47.50	2.50	0.88	0.92	0.92	0.90
		95.00	5.00	0.88	0.93	0.92	0.90
54	0	45.00	5.00	0.86	0.89	0.89	0.89
		90.00	10.00	0.86	0.89	0.89	0.89
		47.50	2.50	0.86	0.91	0.89	0.89
		95.00	5.00	0.86	0.92	0.89	0.89

DEFINITION OF VARIABLES IN COMPUTER PROGRAM

VARIABLE	DEFINITION
A(MM)	Value of parameter in a prior Beta density $\beta(x;a,b)$ for case MM
AB	a for Bayesian prior $\beta(x;a,b)$
ABC	AC + BC
ABG	Recurisive value of a when calculating $\Gamma(a)$
AWI	Initial value for a when calculating ad hoc lower confidence limits
AP	Value of a when computing a new prior density for the ad hoc method after a failure
AC	R * 4 version of IAC
B(MM)	Value of parameter b in prior Beta density $\beta(x;a,b)$ for case MM
BB	b for Bayesian prior $\beta(x;a,b)$
BBG	Recursive value of b when calculating $\Gamma(b)$
BC	R * 4 version of IBC
BCL05	Bayesian lower confidence limit for α=.05
BCL10	Bayesian lower confidence limit for α=.10
BCL20	Bayesian lower confidence limit for α=.20
BP	Value of b when computing a new prior density for the ad hoc method after a failure
BWI	Initial value for b when calculating ad hoc lower confidence limits
CCL05	Classical lower confidence limit for α=.05
CCL10	Classical lower confidence limit for α=.10
CCL20	Classical lower confidence limit for α=.20
FAABB	Contribution of fractional portion for calculating $\Gamma(a+b)$

VARIABLE	DEFINITION
FABG	Contribution of fractional portion for calculating $\Gamma(a)$
FBBG	Contribution of fractional portion for calculating $\Gamma(b)$
GA	Ln $[\Gamma(a)]$
GAB	Ln $[\Gamma(a+b)]$
GAM	$\Gamma(a+b)/\Gamma(a)\ \Gamma(b)$
GAMA	$\Gamma(a)$
GAMAB	$\Gamma(a+b)$
GAMB	$\Gamma(b)$
GB	Ln $[\Gamma(b)]$
I	Number of failures + 1 to date when generating test sequence
IAC	a in Classical $\beta(x;a,b)$
IBC	b for Classical $\beta(x;a,b)$
II	Number of failures to date when calculating ad hoc lower confidence limit
J	Trial number
JJ	Number of successes since the last failure
K#	Logical switch to determine if simplified calculation can be made to determine GAM
L	Dimension counter for cases in ad hoc lower confidence limit
M	Case number for sequence generation
MM	Case number for initial values of a and b
N(M)	Number of trials in the Mth sequence
R(I,M)	Underlying reliability
RN	Random number uniform on [0,1]

VARIABLE	DEFINITION
T(N,J)	Logical variable denoting result of Jth trial in Nth sequence
WCL05	Ad hoc lower confidence limit, α=.05
WCL10	Ad hoc lower confidence limit, α=.10
WCL20	Ad hoc lower confidence limit, α=.20

COMPUTER PROGRAM

```
      DIMENSION A(4), B(4), BCL05(3,100,4), BCL10(3,100,4),
     1BCL20(3,100,4), CCL05(3,100), CCL10(3,100),
     2CCL20(3,100), N(3), WCL05(3,100,4,2),
     3WCL10(3,100,4,2), WCL20(3,100,4,2), R(5,3)
      INTEGER T(3,100)
      READ(5,1) R
1     FORMAT(5F10.3)
      IARG = -2
      RN = URN(IARG)
      IARG = 1
C
C     SEQUENCE GENERATION
C
      DO 99 M=1,3
      I = 1
      J = 1
2     RN = URN(IARG)
      IF (RN.LE.R(I,M)) GO TO 3
      T(M,J)= 0
      I=I+1
      IF (I.GE.6) GO TO 99
      IF (J.GT.99) GO TO 99
      J=J+1
      GO TO 2
3     T(M,J)= 1
      IF (J.GT.99) GO TO 99
      J=J+1
      GO TO 2
99    N(M)=J
C
C     CALCULATION OF CLASSICAL LOWER CONFIDENCE LIMIT
C
      DO 199 M=1,3
      IAC=0
      IBC=1
      NM = N(M)
      DO 198 J=1,NM
      IF (T(M,J).GT.0) GO TO 101
      IBC=IBC+1
      IF (IAC.GE.1) GO TO 102
      CCL05(M,J)=0.0
      CCL10(M,J)=0.0
      CCL20(M,J)=0.0
      GO TO 198
101   IAC=IAC+1
102   AC=IAC
      BC=IBC
      ABC=AC+BC
      GA=0.0
103   IF (AC.LT.2.0) GO TO 104
      AC=AC-1.0
      GA=GA+ALOG(AC)
      GO TO 103
104   GB=0.0
105   IF (BC.LT.2.0) GO TO 106
      BC=BC-1.0
      GB=GB+ALOG(BC)
      GO TO 105
106   GAB=0.0
107   IF (ABC.LT.2.0) GO TO 108
      ABC=ABC-1.0
      GAB=GAB+ALOG(ABC)
      GO TO 107
108   GAM = 2.71828**(GAB-(GA+GB))
      AREA = 0.0
      X = .005
109   RAREA = .01*GAM*(X**(IAC-1))*((1-X)**(IBC-1))
      AREA = AREA + RAREA
```

```
      IF (AREA.GE..05) GO TO 110
      X = X + .01
      GO TO 109
110   CCL05(M,J) = X + .005
111   X = X + .01
      RAREA = .01*GAM*(X**(IAC-1))*((1-X)**(IBC-1))
      AREA = AREA + RAREA
      IF (AREA.GE..10) GO TO 112
      GO TO 111
112   CCL10(M,J) = X + .005
113   X = X + .01
      RAREA = .01*GAM*(X**(IAC-1))*((1-X)**(IBC-1))
      AREA = AREA + RAREA
      IF (AREA.GE..20) GO TO 114
      GO TO 113
114   CCL20(M,J) = X + .005
108   CONTINUE
100   CONTINUE
      READ(5,201) A,B
201   FORMAT (8F10.4)
C
C     CALCULATION OF BAYESIAN LOWER CONFIDENCE LIMIT
C
      DO 300 MM=1,4
      AB = A(MM)
      BB = B(MM)
      ABG = AB
      BBG = BB
      AABBG = AB + BB
      GA = 0.0
      GB = 0.0
      GAB = 0.0
202   IF (ABG.LT.2.0) GO TO 203
      ABG = ABG - 1.0
      GA = GA + ALOG(ABG)
      GO TO 202
203   ABG = ABG - 1.0
      FABG = 1.0 - .5771017*(ABG) + .9858540*(ABG**2)
     1 - .8764218*(ABG**3) + .8328212*(ABG**4) - .5684729*
     2(ABG**5) + .2548205*(ABG**6) -.0514993*(ABG**7)
204   IF (BBG.LT.2.0) GO TO 205
      BBG = BBG - 1.0
      GB = GB + ALOG(BBG)
      GO TO 204
205   BBG = BBG - 1.0
      FBBG = 1.0 - .5771017*(BBG) + .9858540*(BBG**2)
     1 - .8764218*(BBG**3) + .8328212*(BBG**4) - .5684729*
     2(BBG**5) + .2548205*(BBG**6) -.0514993*(BBG**7)
206   IF (AABBG.LT.2.0) GO TO 207
      AABBG = AABBG - 1.0
      GAB = GAB + ALOG(AABBG)
      GO TO 206
207   AABBG = AABBG - 1.0
      FAABB = 1.0 - .5771017*(AABBG) + .9858540*(AABBG**2)
     1 - .8764218*(AABBG**3) + .8328212*(AABBG**4) -
     2 .5684729*(AABBG**5) + .2548205*(AABBG**6) -
     3 .0514993*(AABBG**7)
      GAM = 2.71828 ** (GAB - (GA + GB))
      GAM = GAM * (FAABB/(FABG*FBBG))
      Y = GAM
      DO 299  M = 1,3
      GAM = Y
      AB = A(MM)
      BB = B(MM)
      NM = N(M)
      DO 298 J=1,NM
      AABB = AB + BB
      IF (T(M,J).GT.0) GO TO 208
      GAM = GAM * (AABB/BB)
      BB = BB + 1.0
      AABB = AABB + 1.0
      GO TO 209
```

```
208   GAM = GAM * (AABB/AB)
      AB = AB + 1.0
      AABB = AABB + 1.0
209   AREA = 0.0
      X = .005
210   RAREA = .01 * GAM * (X**(AB-1.0)) * ((1.0-X)**(BB-1.0)
     1)
      AREA = AREA + RAREA
      IF (AREA.GE..05) GO TO 211
      X = X + .01
      GO TO 210
211   BCL05(M,J,MM) = X + .005
212   X = X + .01
      RAREA = .01 * GAM * (X**(AB-1.0)) * ((1.0-X)**(BB-1.0)
     1)
      AREA = AREA + RAREA
      IF (AREA.LT..10) GO TO 212
      BCL10(M,J,MM) = X  + .005
213   X = X + .01
      RAREA = .01 * GAM * (X**(AB-1.0)) * ((1.0-X)**(BB-1.0)
     1)
      AREA = AREA + RAREA
      IF (AREA.LT..20) GO TO 213
      BCL20(M,J,MM) = X + .005
298   CONTINUE
299   CONTINUE
300   CONTINUE
C
C     CALCULATION OF AD HOC LOWER CONFIDENCE LIMIT
C
      DO 400 M = 1,3
      DO 399 MM = 1,4
      AWI = A(MM)
      BWI = B(MM)
      L = 0
      DO 398 K = 5,10,5
      II = 0
      KO = 0
      L = L + 1
      NM = N(M)
      DO 397 J=1,NM
      IF (T(M,J).GT.0) GO TO 301
      II = II + 1
      AP = J - II
      BP = II
      AWO = AP
      BWO = BP
      II = 0
      AW = AWO + 1 - II
      BW = BWO + II
      K0 = 0
      K1 = 0
      K2 = 0
      K3 = 0
      K4 = 0
      K5 = 0
      K6 = 0
      K7 = 0
      K8 = 0
      K9 = 0
      K10 = 0
      IF(AW.GT.1.0) GO TO 370
      WCL05(M,J,MM,L) = 0.0
      WCL10(M,J,MM,L) = 0.0
      WCL20(M,J,MM,L) = 0.0
      GO TO 397
301   IF (II.GT.0 ) GO TO 303
      IF (KO.GT.0) GO TO 302
      AW = AWI + 1
      BW = BWI
      KO = 1
      GO TO 370
```

```
302     GAM = GAM * ((AW+BW)/AW)
        AW = AW + 1
        GO TO 380
303     JJ = JJ + 1
        IF (JJ.GE.K) GO TO 304
        IF(AW.LT.1.0) GO TO 3035
        GAM = GAM * ((AW+BW)/AW)
        AW = AW + 1
        GO TO 380
3035    AW = AW + 1.0
        GO TO 370
304     KK = 2 * K
        IF (JJ.GE.KK) GO TO 306
        IF (K1.GT.0) GO TO 305
        AW1 = (AW0+AWI)/2.0
        BW1 = (BW0+BWI)/2.0
        AW = AW1 + J - II
        BW = BWI + II
        K1 = 1
        GO TO 370
305     GAM = GAM * ((AW+BW)/AW)
        AW = AW + 1
        GO TO 380
306     KK = 3 * K
        IF (JJ.GE.KK) GO TO 308
        IF (K2.GT.0) GO TO 307
        AW2 = (AW1+AWI)/2.0
        BW2 = (BW1+BWI)/2.0
        AW = AW2 + J - II
        BW = BW2 + II
        K2 = 1
        GO TO 370
307     GAM = GAM * (AW + BW)/AW
        AW = AW + 1.0
        GO TO 380
308     KK = 4*K
        IF (JJ.GE.KK) GO TO 310
        IF (K3.GT.0) GO TO 309
        AW3 = (AW2 + AWI)/2.0
        BW3 = (BW2+BWI)/2.0
        AW = AW3 + J - II
        BW = BW3 + II
        K3 = 1
        GO TO 370
309     GAM = GAM * (AW+BW)/AW
        AW = AW + 1.0
        GO TO 380
310     KK = 5*K
        IF (JJ.GE.KK) GO TO 312
        IF (K4.GT.0) GO TO 311
        AW4 = (AW3+AWI)/2.0
        BW4 = (BW3+BWI)/2.0
        AW = AW4 + J - II
        BW = BW4 + II
        K4 = 1
        GO TO 370
311     GAM = GAM * (AW+BW)/AW
        AW = AW + 1.0
        GO TO 380
312     KK = 6 * K
        IF (JJ.GE.KK) GO TO 314
        IF (K5.GT.0) GO TO 313
        AW5 = (AW4+AWI)/2.0
        BW5 = (BW4+BWI)/2.0
        AW = AW5 + J - II
        BW = BW5 + II
        K5 = 1
        GO TO 370
313     GAM = GAM * (AW+BW)/AW
        AW = AW + 1.0
        GO TO 380
314     KK = 7*K
```

```
      IF (JJ.GE.KK) GO TO 316
      IF (K6.GT.0) GO TO 315
      AW6 = (AW5+AWI)/2.0
      BW6 = (BW5+BWI)/2.0
      AW = AW6 + J - II
      BW = BW6 + II
      K6 = 1
      GO TO 370
315   GAM = GAM * (AW+BW)/AW
      AW = AW + 1.0
      GO TO 380
316   KK = 8*K
      IF (JJ.GE.KK) GO TO 318
      IF (K7.GT.0) GO TO 317
      AW7 = (AW6+AWI)/2.0
      BW7 = (BW6+BWI)/2.0
      AW = AW7 + J - II
      BW = BW7 + II
      K7 = 1
      GO TO 370
317   GAM = GAM * (AW+BW)/AW
      AW = AW + 1.0
      GO TO 380
318   KK = 9*K
      IF (JJ.GE.KK) GO TO 320
      IF (K8.GT.0) GO TO 319
      AW8 = (AW7+AWI)/2.0
      BW8 = (BW7+BWI)/2.0
      AW = AW8 + J - II
      BW = BW8 + II
      K8 = 1
      GO TO 370
319   GAM = GAM * (AW+BW)/AW
      AW = AW + 1.0
      GO TO 380
320   KK = 10*K
      IF (JJ.GE.KK) GO TO 322
      IF (K9.GT.0) GO TO 321
      AW9 = (AW8+AWI)/2.0
      BW9 = (BW8+BWI)/2.0
      AW = AW9 + J - II
      BW = BW9 + II
      K9 = 1
      GO TO 370
321   GAM = GAM * (AW+BW)/AW
      AW = AW + 1.0
      GO TO 380
322   WCL05(M,J,MM,L) = BCL05(M,J,MM)
      WCL10(M,J,MM,L) = BCL10(M,J,MM)
      WCL20(M,J,MM,L) = BCL20(M,J,MM)
      GO TO 397
370   AG = AW
      BG = BW
      ABG = AW + BW
      GA = 0.0
      GB = 0.0
      GAB = 0.0
371   IF (AG.LT.2.0) GO TO 372
      AG = AG - 1.0
      GA = GA + ALOG(AG)
      GO TO 371
372   AG = AG - 1.0
      FAG = 1.0 - .5771017*(AG) + .9858540*(AG**2) -
     1.8764218*(AG**3) + .8328212*(AG**4) - .5684729*(AG**5)
     2+ .2548205*(AG**6) - .0514993*(AG**7)
373   IF (BG.LT.2.0) GO TO 374
      BG = BG - 1.0
      GB = GB + ALOG(BG)
      GO TO 373
374   BG = BG - 1.0
      FBG = 1.0 - .5771017*(BG) + .9858540*(BG**2) -
     1.8764218*(BG**3) + .8328212*(BG**4) - .5684729*(BG**5)
```

```
     2+ .2548205*(BG**6) - .0514993*(BG**7)
375   IF (ABG.LT.2.0) GO TO 376
      ABG = ABG - 1.0
      GAB = GAB + ALOG(ABG)
      GO TO 375
376   ABG = ABG - 1.0
      FABG = 1.0 - .5771017*(ABG) + .9858540*(ABG**2)
     1- .8764218*(ABG**3) + .8328212*(ABG**4) - .5684729*
     1(ABG**5) + .2548205*(ABG**6) - .0514993*(ABG**7)
      GAM = 2.71828**(GAB-(GA+GB))
      GAM = GAM * (FABG/(FAG*FBG))
380   AREA = 0.0
      X = .005
381   RAREA = .01 * GAM * (X**(AW-1.0)) * ((1-X)**(BW-1.0))
      AREA = AREA + RAREA
      IF (AREA.GE..05) GO TO 382
      X = X + .01
      GO TO 381
382   WCL05(M,J,MM,L) = X + .005
383   X = X + .01
      RAREA = .01 * GAM * (X**(AW-1.0)) * ((1-X)**(BW-1.0))
      AREA = AREA + RAREA
      IF (AREA.GE..10) GO TO 384
      GO TO 383
384   WCL10(M,J,MM,L) = X + .005
385   X= X + .01
      RAREA = .01 * GAM * (X**(AW-1.0)) * ((1-X)**(BW-1.0))
      AREA = AREA + RAREA
      IF (AREA.GE..20) GO TO 386
      GO TO 385
386   WCL20(M,J,MM,L) = X + .005
397   CONTINUE
398   CONTINUE
399   CONTINUE
400   CONTINUE
C
C     PRINTING OF OUTPUT
C
      DO 499 M=1,3
      WRITE(6,4005)
4005  FORMAT(1H1,////1X,T11,'SIGNIFICANCE LEVEL = .05')
      WRITE(6,401) M
401   FORMAT(1H ,////1X,T14,'SEQUENCE NUMBER',I2//)
      WRITE(6,402) R(1,M), R(2,M), R(3,M), R(4,M), R(5,M)
402   FORMAT(1H ,'UNDERLYING RELIABILITIES',5F5.2)
      WRITE(6,403)
403   FORMAT(1H0,'TRIAL',T9,'TRIAL',T44,'K=5    K=10')
      WRITE(6,404)
404   FORMAT(1H ,'NUMBER RESULT  A        B      CCL05 ',
     1T37,'BCL05 WCL05 WCL05')
      NM = N(M)
      DO 498 J=1,NM
      WRITE(6,405) J, T(M,J), A(1), B(1), CCL05(M,J),
     1BCL05(M,J,1), WCL05(M,J,1,1), WCL05(M,J,1,2)
405   FORMAT(1H0,T3,I2,T10,I2,T15,F5.2,T22,F5.2,T29,4F6.2)
      DO 497 MM=2,4
      WRITE(6,406) A(MM), B(MM),CCL05(M,J), BCL05(M,J,MM),
     1WCL05(M,J,MM,1), WCL05(M,J,MM,2)
406   FORMAT(1H ,T15,F5.2,T22,F5.2,T29,4F6.2)
497   CONTINUE
498   CONTINUE
499   CONTINUE
      DO 599 M=1,3
      WRITE(6,5005)
5005  FORMAT(1H1,////1X,T11,'SIGNIFICANCE LEVEL = .10')
      WRITE(6,401) M
      WRITE(6,402) R(1,M), R(2,M), R(3,M), R(4,M), R(5,M)
      WRITE(6,403)
      WRITE(6,504)
504   FORMAT(1H ,'NUMBER RESULT  A        B      CCL10 ',
     1T37,'BCL10 WCL10 WCL10')
      NM = N(M)
```

```
      DO 598 J=1,NM
      WRITE(6,405) J, T(M,J), A(1), B(1), CCL10(M,J),
     1BCL10(M,J,1), WCL10(M,J,1,1), WCL10(M,J,1,2)
      DO 597 MM=2,4
      WRITE(6,406) A(MM), B(MM),CCL10(M,J), BCL10(M,J,MM),
     1WCL10(M,J,MM,1), WCL10(M,J,MM,2)
597   CONTINUE
598   CONTINUE
599   CONTINUE
      DO 699 M=1,3
      WRITE(6,6005)
6005  FORMAT(1H1,////1X,T11,'SIGNIFICANCE LEVEL = .20')
      WRITE(6,401) M
      WRITE(6,402) R(1,M), R(2,M), R(3,M), R(4,M), R(5,M)
      WRITE(6,403)
      WRITE(6,604)
604   FORMAT(1H ,'NUMBER RESULT  A        B      CCL20 ',
     1T37,'BCL2C WCL20 WCL20')
      NM = N(M)
      DO 698 J=1,NM
      WRITE(6,405) J, T(M,J), A(1), B(1), CCL20(M,J),
     1BCL20(M,J,1), WCL20(M,J,1,1), WCL20(M,J,1,2)
      DO 697 MM=2,4
      WRITE(6,406) A(MM), B(MM),CCL20(M,J), BCL20(M,J,MM),
     1WCL20(M,J,MM,1), WCL20(M,J,MM,2)
697   CONTINUE
698   CONTINUE
699   CONTINUE
      END
```

DATA DECK

```
  .5        .5        .5        .8        .8
  .7        .7        .9        .9        .9
  .8        .9        .95       .95       .95
 45.0   90.0   47.5   95.0   5.0   10.0   2.5   5.0
```

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13. ABSTRACT

This thesis proposes and analyzes an ad hoc Bayesian method for determining lower confidence limits for estimates of mission reliability of single components using pass/fail test data. Several test sequences with different underlying reliabilities are simulated. After each trial the lower confidence limits are calculated using the Classical method, the Bayesian method and the proposed method. This is followed by an accuracy simulation to estimate the accuracy of the proposed method. The proposed method shows promise for future usefulness in that it is capable of demonstrating a high degree of reliability with a relatively small number of trials while maintaining some degree of protection against accepting unreliable components.

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