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2 RELIABILITY DEMONSTRATION FOR BERNOULLI TRIALS (BERNOULLI.BAS)
3 ORIGINAL DATE: Circa 1985
4 REVISION DATE: October 25, 2020
5 AUTHOR: Phil Rutherford
6 RUN DATE: 25-10-2020 (DD-MM-YYYY)
7 RUN TIME: 22:05:23
8 RUN WITH MMBASIC.EXE (www.mmbasic.com)
9
10 RELIABILITY DEMONSTRATION USING BERNOULLI TRIALS. CALCULATES
11 THE NUMBER OF TRIALS FOR A GIVEN NUMBER OF FAILURES, OR THE
12 NUMBER OF FAILURES FOR A GIVEN NUMBER OF TRIALS. INPUT DESIRED
13 RELIABILITY TO BE DEMONSTRATED AT A SPECIFIC CONFIDENCE LEVEL
14 AND PRODUCER'S RISK.
15 * CONSUMER'S RISK -- TRUE RELIABILITY < DESIRED RELIABILITY
16 * PRODUCER'S RISK -- TRUE RELIABILITY > DESIRED RELIABILITY
17
18 TEST PROGRAM REQUIREMENTS
19
20 ESTIMATED NO. OF TRIALS           ? 100
21 ESTIMATED NO. OF FAILURES        ? 10
22 DEMONSTRATED RELIABILITY         ? 0.95
23 CONFIDENCE LEVEL (%)             ? 90
24 CONSUMER'S RISK GOAL (%)         10
25 PRODUCER'S RISK GOAL (%)        ? 10
26 ITERATE ON TRIALS (T) OR FAILURES (F) ? F
27
28 ITERATIVE DETERMINATION OF NEEDED TEST PROGRAM
29 ITERATE ON NUMBER OF FAILURES
30
31 TRIALS   FAILURES   DEMONSTRATED   CONFIDENCE   CONSUMER'S
32          RELIABILITY LEVEL (%)   RISK (%)
33
34 100      10        0.95          1.147241007  98.85275899
35 100      9         0.95          2.818829416  97.18117058
36 100      8         0.95          6.308959063  93.69104094
37 100      7         0.95          12.79604786  87.20395214
38 100      6         0.95          23.3986016   76.6013984
39 100      5         0.95          38.4000872   61.5999128
40 100      4         0.95          56.40186993  43.59813007
41 100      3         0.95          74.21613409  25.78386591
42 100      2         0.95          88.17370188  11.82629812
43 100      1         0.95          96.29187907  3.708120933
44
45 PRODUCER'S   TRUE
46 RISK (%)    RELIABILITY
47
48 96.29187907  0.95
49 95.95329753  0.951
50 95.58554832  0.952
51 95.18633183  0.953
52 94.75319443  0.954
53 94.28352193  0.955
54 93.77453345  0.956
55 93.22327571  0.957
56 92.62661796  0.958
57 91.98124787  0.959
58 91.28366833  0.96
59 90.53019578  0.961
60 89.71696006  0.962
61 88.8399063   0.963
62 87.89479936  0.964
63 86.87723099  0.965
64 85.78263063  0.966
65 84.6062802   0.967
66 83.34333375  0.968

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67	81.98884275	0.969
68	80.53778799	0.97
69	78.98511914	0.971
70	77.3258032	0.972
71	75.5548833	0.973
72	73.66754934	0.974
73	71.65922233	0.975
74	69.5256545	0.976
75	67.2630474	0.977
76	64.86819069	0.978
77	62.33862452	0.979
78	59.67282892	0.98
79	56.87044384	0.981
80	53.93252418	0.982
81	50.86183457	0.983
82	47.66318931	0.984
83	44.3438434	0.985
84	40.91394172	0.986
85	37.38703372	0.987
86	33.78066245	0.988
87	30.11703739	0.989
88	26.42380211	0.99
89	22.73490856	0.991
90	19.09161198	0.992
91	15.54360122	0.993
92	12.15028187	0.994
93	8.982230899	0.995
94	9.286630707	0.9949
95	9.594015557	0.9948
96	9.904297378	0.9947
97	10.21738952	0.9946
98	9.904297378	0.9947
99	9.935481545	0.99469
100	9.966693729	0.99468
101	9.997933843	0.99467
102	10.0292018	0.99466
103	9.997933843	0.99467

104  
105 REQUIRED TEST PROGRAM SUMMARY

107	TRIALS	100
108	FAILURES	1
109	REQUIRED RELIABILITY	0.95
110	CONFIDENCE LEVEL (%)	96.29187907
111	CONSUMER'S RISK (%)	3.708120933
112	PRODUCER'S RISK (%)	9.997933843
113	TRUE RELIABILITY	0.99467

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