

```

1
2  BINOMIAL REDUNDANT RELIABILITY WITH EXPONENTIAL OR WEIBULL FAILURE DISTRIBUTION
  (BINWEIB.BAS)
3
4  ORIGINAL DATE: Circa 1986
5  REVISION DATE: October 29, 2020
6  AUTHOR: Phil Rutherford (www.philrutherford.com)
7  RUN DATE: 29-10-2020 (DD-MM-YYYY)
8  RUN TIME: 21:57:32
9  RUN WITH MMBASIC.EXE (www.mmbasic.com)
10
11 MINIMUM NUMBER OF OPERATING UNITS REQUIRED          ? 5
12 MAXIMUM NUMBER OF REDUNDANT UNITS                 ? 5
13 EXPONENTIAL OR WEIBULL FAILURE DISTRIBUTION (E/W) ? W
14 WEIBULL ALPHA > 0 AND < 1  CONCAVE DECREASING FAILURE RATE
15 WEIBULL ALPHA = 1          CONSTANT FAILURE RATE (EXPONENTIAL DISTRIBUTION)
16 WEIBULL ALPHA > 1 AND < 2  CONVEX INCREASING FAILURE RATE
17 WEIBULL ALPHA = 2          LINEAR INCREASING FAILURE RATE (RAYLEIGH DISTRIBUTION)
18 WEIBULL ALPHA > 2          CONCAVE INCREASING FAILURE RATE
19 WEIBULL ALPHA                                     ? 3
20 WEIBULL BETA > 0 (= 1 / CONSTANT FAILURE RATE IF ALPHA = 1)
21 WEIBULL BETA > 0                                     ? 100000
22 MISSION TIME (HOURS)                                ? 87600
23
24 BINOMIAL RELIABILITY RESULTS
25
26 WEIBULL FAILURE DISTRIBUTION
27 FOR 5 UNITS REQUIRED AND ZERO TO 5 REDUNDANT UNITS AVAILABLE
28 UNIT FAILURE RATE AT MISSION TIME (T) IS (A/B)*(T/B)^(A-1) = 2.302128e-05 PER HOUR
  (WEIBULL)
29 ALPHA (A) = 3
30 BETA (B) = 100000
31 MISSION TIME = 87600 HOURS
32
33 SINGLE UNIT RELIABILITY IS 0.5105731422                Pr(= 1 / 1 .S)
34
35 RELIABILITY OF 5 OPERATING AND 0 REDUNDANT UNITS IS 0.03469683245 Pr(=> 5 / 5 .S)
36 RELIABILITY OF 5 OPERATING AND 1 REDUNDANT UNITS IS 0.1196046409 Pr(=> 5 / 6 .S)
37 RELIABILITY OF 5 OPERATING AND 2 REDUNDANT UNITS IS 0.2442731265 Pr(=> 5 / 7 .S)
38 RELIABILITY OF 5 OPERATING AND 3 REDUNDANT UNITS IS 0.3866440386 Pr(=> 5 / 8 .S)
39 RELIABILITY OF 5 OPERATING AND 4 REDUNDANT UNITS IS 0.5260043348 Pr(=> 5 / 9 .S)
40 RELIABILITY OF 5 OPERATING AND 5 REDUNDANT UNITS IS 0.6487763443 Pr(=> 5 / 10 .S)
41 >

```