

Easy to use High Availability formulas

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1 Definitions

Let be:

1. K a timesample in hour (usually one year: 8760 hours)
2. f the number of failures per timesample
3. T the MTTR¹
4. B the MTBF²
5. R the reliability of a device
6. P the probability of a device to be up

2 Formulas

The T and B of a single device can be found using these simple relations (we assume that a year has 8760 hours):

$$B = \frac{K}{f} \quad (1)$$

$$P = \frac{B}{B + T} = \frac{K}{K + T \cdot f} \quad (2)$$

$$R = 100 \cdot P \quad (3)$$

Given probabilities of n devices, we can guess their total serial probability:

$$P_t = 1 - \sum_{i=0}^n (1 - P_i) \quad (4)$$

¹Mean Time To Repair, in hour

²Mean Time Between Failure, in hour

Similarly we can guess probabilities of n parallel devices:

$$P_t = \frac{1}{1 + \prod_{i=0}^n (1 - P_i)} \quad (5)$$