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interchangeably. A confidence interval is a way of expressing uncertainty about a simple unknown constant. In the analysis of the performance of a repository, for example, the probability of the value of an input parameter to a mathematical model must be assumed in order to perform Monte Carlo simulations. The parameter in question will often be represented as a probability distribution, with the confidence interval representing the probability interval.

A constant is a constant whether we know its value or not, and is not a random variable. It can be quite wrong to probabilistically combine confidence intervals of several constants to obtain a confidence interval on a function of several unknown constants. (Easterling, 1974). Use of confidence intervals as probabilities usually leads to pessimistic confidence intervals of the function. Some mathematicians argue that statistical techniques dealing with confidence intervals should always be used (Mann, et. al, 1974). Others state that, while the above argument may have merit, it is impossible to implement in a practical way for performance assessments (Conover, et.al., 1980).

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References

1. N.R. Mann, R.E. Schafer, N.D. Singpurwalla, Methods for Statistical Analysis of Reliability and Life Data, John Wiley and Sons, New York, 1974
2. R.E. Easterling, "On the Use of Confidence Intervals as Probability Intervals", USNRC, NR-ASG-001, 1974
3. The Random House College Dictionary, Random House, New York, 1973
4. J. Conover, M. Gillespi, S. Yakowitz, "System Analysis", in Uncertainty Analysis of Post Closure Nuclear Waste Isolation System Performance, Intera Environmental Consultants Inc., Houston Texas, October, 1980

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