

A General Bias Correction Method for the Estimation of Weibull Common Shape Parameter

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The estimation of the common shape parameter across different Weibull populations is an important and general problem in reliability analysis. However, it is widely recognized that the estimation accuracy will be largely affected by small sample size, and many involved Weibull groups, etc. This paper aims to study a general method for correcting the biases rooted in least squares estimator and maximum likelihood estimator of the common shape parameter of Weibull populations. Simulation results show the effectiveness and robustness of the method in bias correction for almost all combinations of sample size and number of populations involved. The method can be extended to more complicated failure data.

Key Words: Stochastic expansion, least squares estimator, maximum likelihood estimator, bootstrap, Monte Carlo simulation