Repairable system model with time dependent covariate

ABSTRACT

In this paper we extend a repairable system model that incorporates both time trend and renewal-type behavior to include a time dependent covariate. We calculated the bias, standard error andrmse of the parameter estimates of this model at different sample sizes using simulated data.Following that, we studied several alternative computer intensive methods of constructingconfidence interval estimates for the parameters of the general model. Alternative methodsrelieve us from making assumptions and having to depend solely on the traditional methods derived from asymptotic statistical theory. In addition, the high capability of modern daycomputers makes these methods easily applicable and practical. Several parametric bootstrap methods and jackknife confidence interval procedures were compared to the Wald interval via coverage probability study. The results clearly show that the B-t and jackknife techniques work much better than other methods when sample sizes are moderate and low. The Wald intervals was found to be highly asymmetrical and only starts to work when sample sizes are rather large.

Keyword: Bootstrap; Jackknife; Repairable