

Bayesian Modelling of Virtual Age in Repairable Systems

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Abstract

In this study, repairable system models, which are subject to minimal, perfect or imperfect repairs upon each failure, are discussed and a unifying model covering all these type of models is presented. Moreover, some extensions of this general model are proposed. These models are generally marked point processes, $(T_1, Z_1), (T_2, Z_2), \dots, (T_n, Z_n)$ where T_i 's are failure times and Z_i 's are repair choices. The marks of this marked point process, i.e. repair actions, are assumed to be unknown and unobservable so modeled as latent variables. According to the dependence structure of the latent variables various models are developed. For the statistical analysis of these models, Bayesian framework is presented and posterior distributions are obtained through Markov Chain Monte Carlo methods.