

CO6 - Estatística Longitudinal e Sobrevivência

Unobserved Heterogeneity for Multiple Repairable Systems Under ARA and ARI Classes of Imperfect Repair

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In repairable systems, different types of repair can be performed after the occurrence of each failure, which can impact the system reliability over time. Furthermore, due to the nature of the recurrence of events inherent to this type of systems, it is not reasonable to ignore the possibility of the existence of dependence between the failure times of each system and/or the unobserved heterogeneity (or frailty) between multiple systems analyzed together. Thus, the main purpose of this work is to present two models of parametric frailty shared between multiple repairable systems under an imperfect repair. We consider the both classes ARA (arithmetic reduction of age) and ARI (arithmetic reduction of intensity) of the imperfect repair family model and any number of failure memory. It is assumed that the failure intensity function of the model follows a Power Law Process and that the parametric frailty terms of all systems follow the same Gamma distribution. The frequentist approach is used to construct the likelihood function of the model and numerical methods are suggested to obtain the maximum likelihood estimators and their respective confidence intervals. Finally, the presented procedures are applied to a real data set known in the literature.

Palavras-chave: Repairable Systems; Imperfect Repair; Frailty Model; Unobserved Heterogeneity; Power Law Process.

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