Universidade de Brasília
Departamento de Estatística

UnB

O Programa de Pós-Graduação em Estatística convida para:

WEBINAR

Semi-parametric Bayesian models for heterogeneous degradation data: An application to Laser data

Palestrante:

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DATA: 19/08/2021 (quinta-feira)
HORÁRIO: 14:30h (horário local de Brasília)

O seminário é público e poderá ser assistido pelo Link

https://teams.microsoft.com/l/meetup-join/19.

Resumo

Degradation data are considered to make reliability assessments in highly reliable systems. The class of general path models is a popular tool to approach degradation data. In this class of models, the random effects correlate the degradation measures in each device. Random effects are interpreted in terms of the degradation rates, which facilitates the specification of their prior distribution. The usual approaches assume that the devices under test come from a homogeneous population. This assumption is strong, mainly, if the variability in the manufacturing process is high or there are no guarantees that the devices work on similar conditions. To account for heterogeneous degradation data, we develop semi-parametric degradation models based on the Dirichlet process mixture of both, normal and skew-normal distributions. The proposed model accommodates different shapes for the degradation rate distribution and also allows the estimation of the number of populations involved in the study. We prove that the proposed model also imposes heterogeneity in the lifetime data. We introduce a method to build the prior distributions which adapt previous approaches to the context in which mixture models fit latent variables. We carry out simulation studies and data analysis to show the flexibility of the proposed model in modeling skewness, heavy tail and multi-modal behavior of the random effects. Results show that the proposed models are competitive approaches to analyze degradation data.

(Trabalho conjunto com Cristiano C. Santos)

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