

Accelerated Failure Time model for Repairable Systems

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Abstract

When studying the service record of a device which is a subject to degradation, we want to estimate the time-to-failure distribution for maintenance optimization. The dependency of the failure time distribution on applicable regression variables can be described with a suitable model. For instance, we may use the number of repairs and maintenance actions or their cost as time-varying covariates. For this situation, the Cox proportional hazards model has been suggested, with the repairs and maintenance actions influencing the hazard function multiplicatively. Alternatively, we can use the Accelerated failure time model, where the covariates cause the internal time of the device to flow faster or slower. In this work we describe such models and demonstrate their application on real data.

Keywords: Reliability analysis, Repair models, Regression, Accelerated Failure Time model.

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