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About some extensions of the gamma process and their applications in reliability and maintenance

According to the failure threshold model, degrading units are typically assumed to fail when their degradation level exceeds an assigned threshold limit. Consequently, the reliability function of these units is defined in terms of the first passage time distribution of their degradation process to the assigned threshold.

This degradation process-based approach to reliability modelling offers two main advantages: i) allows estimating the lifetime distribution from degradation data, even in absence of failure; ii) provide a very natural way for making degradation-based of residual reliability estimates and remaining useful life predictions.

Within this framework, this talk discuss three generalizations of the very popular gamma degradation process, which allows to account for the presence of random effect and measurement error, and shows how this models can be used to implement a recently proposed simple and effective hybrid age/condition-based maintenance policy.

Presenter: Prof. GIORGIO, Massimiliano (Universita' degli Studi di Napoli, Federico II)

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