

A model for stochastic dependence implied by failures among deteriorating components

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SUMMARY

In this work a reliability model in which the failure of components affect to the degradation of components still alive is studied. It is assumed that the initial degradation of each component is described in terms of a non-decreasing univariate Lévy process modified by means of a time-scaling function, and the failure of each component is produced when its degradation crosses a fixed threshold. At the beginning, the components work independently, but once the failure of a component is produced, the time scaling function of the components still alive is modified, in order to include the (possible) stress suffered because of the failure. Probabilistic properties of this model are studied, as well as the reliability of a k-out of n system (or in general, any coherent system).

Keywords: reliability, functional dependency, Lévy processes. . .

AMS Classification: 62N05, 62H05

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