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Gamma processes for prognosis: theory, applications and perspectives

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Gamma processes are widely used to model the evolution of the cumulative deterioration of a system over time. Extended gamma processes have been seen as a flexible extension of standard gamma processes in the recent reliability literature, for the purpose of cumulative deterioration modeling. The probabilistic properties of the standard gamma process have been well explored since the 1970s, whereas those of its extension remain largely unexplored. This presentation aims firstly to review the probabilistic properties of standard and extended gamma processes and to present similar ageing properties of both models as well as the extended ones. Secondly, an investigation on the capacity of gamma processes to handle uncertainties for prognosis is provided. Finally, an illustration of some applications of gamma processes is given by highlighting the advantages and disadvantages of such models and by providing some new perspectives.

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