Maintenance Policies for Multi-state Systems

Christoph Riethmueller

Faculty of Mathematics / IMST
Otto-von-Guericke-University of Magdeburg
PF 4120, 39016 Magdeburg, Germany
Email: christoph.riethmueller@ovgu.de

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We consider a multi-state system whose current state and therefore current proneness to failure is determined by a homogeneous Markov chain. In this model we do not necessarily describe single components of the system, but just describe relevant states. We highlight possibilities for obtained hazard rates of the time to failure. We introduce distinct failure types with the aim of a good interpretability of both, states of the system and failure types. Regarding some optimality criteria we want to identify optimal maintenance policies. In case of a failure we investigate state-dependent repair which may include minimal repair, imperfect repair or replacement of the system. We also consider preventive maintenance, in particular age replacement, block replacement and critical state replacement.