Csenki

Dependability for Systems with a Partitioned State Space

Markov and Semi-Markov Theory and Computational Implementation

Probabilistic models of technical systems are studied here whose finite state space is partitioned into two or more subsets. The systems considered are such that each of those subsets of the state space will correspond to a certain performance level of the system. The crudest approach differentiates between 'working' and 'failed' system states only. Another, more sophisticated, approach will differentiate between the various levels of redundancy provided by the system. The dependability characteristics examined here are random variables associated with the state space's partitioned structure; some typical ones are as follows • The sequence of the lengths of the system's working periods; • The sequences of the times spent by the system at the various performance levels; • The cumulative time spent by the system in the set of working states during the first m working periods; • The total cumulative 'up' time of the system until final breakdown; • The number of repair events during a fmite time interval; • The number of repair events until final system breakdown; • Any combination of the above. These dependability characteristics will be discussed within the Markov and semi-Markov frameworks.

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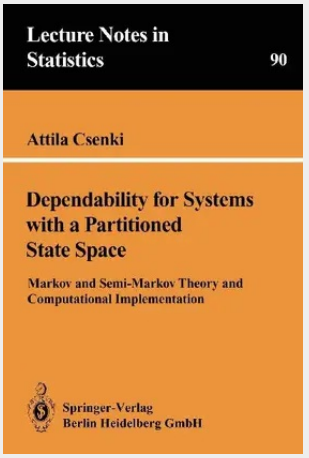

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