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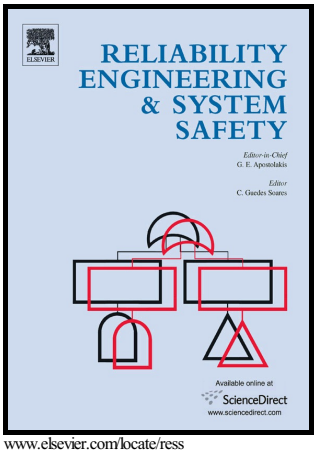

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Selective maintenance of multi-state systems with structural dependence

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Abstract

This paper studies the selective maintenance problem for multi-state systems with structural dependence. Each component can be in one of multiple working levels and several maintenance actions are possible to a component in a maintenance break. The components structurally form multiple hierarchical levels and dependence groups. A directed graph is used to represent the precedence relations of components in the system. A selective maintenance optimization model is developed to maximize the system reliability in the next mission under time and cost constraints. A backward search algorithm is used to determine the assembly sequence for a selective maintenance scenario. The maintenance model helps maintenance managers in determining the best combination of maintenance activities to maximize the probability of successfully completing the next mission. Examples showing the use of the proposed method are presented.

Key words: *Selective maintenance, multi-state system, multi-component system, structural dependence, assembly sequence, directed graph.*

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