

Strategically Optimum Maintenance of Monitoring-enabled Multi-component Systems Using Continuous-time Jump Deterioration Models

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Abstract

Efficient usage of high-tech, costly industrial equipment requires not only a good operations schedule, but also a well-designed maintenance schedule to prevent losses of capital and lives. Condition-based maintenance (CBM) uses real-time information to schedule maintenance. With today's sensor technology, CBM is implemented in practice and supports the delivery of Long-Term Service Agreements (LTSA) by companies (such as G.E., UTC). An LTSA is a service contract, sold bundled with the products, making a provider responsible for maintaining their products over a specified contract period. In this paper, we address the strategic maintenance problem from the provider's perspective. The goal is to find an optimal maintenance strategy for a multi-component system, which suffers continuous stochastic deterioration with jumps. The deterioration of the system is analyzed using a continuous-time simulation and a search algorithm to find the optimal strategic maintenance actions is developed.