

## **An Optimal Bayesian Maintenance Policy for a Partially Observable System Subject to Two Failure Modes**

**Authors :** Akram Khaleghi Ghosheh Balagh, Viliam Makis, Leila Jafari

**Abstract :** In this paper, we present a new maintenance model for a partially observable system subject to two failure modes, namely a catastrophic failure and a failure due to the system degradation. The system is subject to condition monitoring and the degradation process is described by a hidden Markov model. A cost-optimal Bayesian control policy is developed for maintaining the system. The control problem is formulated in the semi-Markov decision process framework. An effective computational algorithm is developed and illustrated by a numerical example.

**Keywords :** partially observable system, hidden Markov model, competing risks, multivariate Bayesian control

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