Condition monitoring: a new perspective

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Abstract

We present a novel approach to support preventive replacement decisions based on condition monitoring. It is assumed that the condition of a technical unit is measured continuously, with the measurement indicating in which of $k \geq 2$ states the unit is. A new unit is in state 1, and failure occurs the moment a unit leaves state k. A unit will only go from state j to state $j+1$, and these immediately noticed transitions occur at random times. At such transition moments a decision is required on preventive replacement of the unit, which would require preparation time. Such a decision needs to be based on inferences about the total residual operating time till failure. We present a method for such inferences that relies on minimal model assumptions added to data on state transitions. We illustrate the approach via simulated examples, and discuss possible use of the method and related aspects.

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