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Prognostic Modeling and Experimental Techniques for Electrolytic Capacitor Health Monitoring

Издательство DEStech Publications, Lancaster, 2011 год

Код: 10388

8 стр; формат: 23,5 x 16 см; библиографический список: 21 единица
ISBN: 978-1-60595-053-2

Electrolytic capacitors are used in several applications ranging from power supplies on safety critical avionics equipment to power drivers for electro-mechanical actuators, and this makes them good candidates for prognostics and health management research. Prognostics provides a way to assess remaining useful life of components or systems based on their current state of health and their anticipated future use and operational conditions. Past experiences show that capacitors tend to degrade and fail faster under high electrical and thermal stress conditions that they are often subjected to during operations. In this paper, we study the effects of accelerated ageing due to thermal stress on a set of capacitors. Our focus is on deriving first principles degradation models for thermal stress conditions. Data collected from simultaneous experiments are used to validate the desired models. Our overall goal is to derive accurate models of capacitor degradation, and use them to predict performance changes in DC-DC converters.

Ключевые слова:

Содержание.

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