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Enhancing Life Cycle Reliability with Robust Engineering and Predictive Health Management

Matthew Hu, Yan-Fu Li, Andre V. Kleyner

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Description

Enhancing Life Cycle Reliability with Robust Engineering and Predictive Health Management

Complete process for ensuring product performance through robust concept design, robust optimization, selection, and verification in an uncontrollable user environment

Enhancing Life Cycle Reliability with Robust Engineering and Predictive Health Management enables readers to build a robustness-thinking-based approach for robust design for reliability and prognostic health management (PHM), explaining best practices from early product design through the entire product lifecycle, leading to lower costs and shorter development cycles. The text integrates key tools and emerging reliability management systems into a comprehensive program for developing more robust and reliable technology-based products.

The text provides value-added strategies for robustness development in new products and health management with three main types of robustness development and reliability growth case studies: intrinsic, instrumental, and collective. Readers can harness multiple forms of engineering knowledge to inform decision-making within reliability contexts.

To ensure customer satisfaction, the text helps readers consciously consider noise factors (environmental variation during the product's usage, manufacturing variation, and component deterioration) and cost of failure in the field for the Robust Design method.

Written by two highly qualified authors, this book includes information on:

- Effective reliability efforts in an integrated product development environment, failure mode avoidance, and reliability analysis using the physics-of-failure process
- Essentials of robustness and robust design in reliability improvement, covering design-in reliability up front, eliminating failures prior to testing, and increasing fielded reliability
- Rapid, cost-effective deployment of health and usage monitoring systems and improving diagnostic and prognostic techniques and processes
- ROI analyses for PHM, selecting and deploying sensors, setting up data transmission channels, and developing data collection and data pre-processing functions

Comprehensive in scope, this book is an essential resource on the subject for all individuals responsible for product development and design, increasing life-cycle product reliability, process quality, or reducing costs in a design, development, manufacturing, and maintenance.

About the Author

Matthew Hu, Senior Vice President, Engineering and Quality, Haylion Technologies, and Adjunct Professor, University of Houston, USA. Dr. Hu is a Certified Robust Design Expert using Taguchi Method, a Certified LSS Master Black Belt, and a certified DFSS Master Black Belt.

Yan-Fu Li, Professor, Tsinghua University, China. He is the Principal Investigator (PI) of several government projects including the key project funded by National Natural Science Foundation of China.

Series

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