



Electric Machines: Modeling, Condition Monitoring, and Fault Diagnosis

Hamid A. Toliyat, Subhasis Nandi, Seungdeog Choi, Hodayoun Meshgin-Kelk

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With countless electric motors being used in daily life, in everything from transportation and medical treatment to military operation and communication, unexpected failures can lead to the loss of valuable human life or a costly standstill in industry. To prevent this, it is important to precisely detect or continuously monitor the working condition of a motor. **Electric Machines: Modeling, Condition Monitoring, and Fault Diagnosis** reviews diagnosis technologies and provides an application guide for readers who want to research, develop, and implement a more effective fault diagnosis and condition monitoring scheme?thus improving safety and reliability in electric motor operation. It also supplies a solid foundation in the fundamentals of fault cause and effect.

Combines Theoretical Analysis and Practical Application

Written by experts in electrical engineering, the book approaches the fault diagnosis of electrical motors through the process of theoretical analysis and practical application. It begins by explaining how to analyze the fundamentals of machine failure using the winding functions method, the magnetic equivalent circuit method, and finite element analysis. It then examines how to implement fault diagnosis using techniques such as the motor current signature analysis (MCSA) method, frequency domain method, model-based techniques, and a pattern recognition scheme. Emphasizing the MCSA implementation method, the authors discuss robust signal processing techniques and the implementation of reference-frame-theory-based fault diagnosis for hybrid vehicles.

Fault Modeling, Diagnosis, and Implementation in One Volume

Based on years of research and development at the Electrical Machines & Power Electronics (EMPE) Laboratory at Texas A&M University, this book describes practical analysis and implementation strategies that readers can use in their work. It brings together, in one volume, the fundamentals of motor fault conditions, advanced fault modeling theory, fault diagnosis techniques, and low-cost DSP-based fault diagnosis implementation strategies.

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