

Engineering Applications of Computational Methods

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Liang Gao, State Key Laboratory of Digital Manufacturing Equipment and Technology, Huazhong University of Science and Technology, Wuhan, Hubei, China

Akhil Garg, School of Mechanical Science and Engineering, Huazhong University of Science and Technology, Wuhan, Hubei, China

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Dinghui Wu · Juan Zhang · Junyan Fan ·
Dandan Tang

Performance Optimization of Fault Diagnosis Methods for Power Systems

Dinghui Wu
School of Internet of Things Engineering
Jiangnan University
Wuxi, Jiangsu, China

Juan Zhang
School of Internet of Things Engineering
Jiangnan University
Wuxi, Jiangsu, China

Junyan Fan
School of Internet of Things Engineering
Jiangnan University
Wuxi, Jiangsu, China

Dandan Tang
School of Internet of Things Engineering
Jiangnan University
Wuxi, Jiangsu, China

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*This book is dedicated to our families, who
have always encouraged and supported us to
explore knowledge and chase our dreams.*

Preface

Fault diagnosis of power systems is a process to detect, locate and identify a variety of faults by analyzing power data such as electrical quantity and switching quantity based on professional knowledge of electrical engineering. Timely and accurate fault diagnosis is conducive to rapid fault removal and reduces the impact of fault as possible. With the development of power systems, the scale is expanded and the structure is getting more and more complex, making the stability analysis of power systems more and more difficult. Traditional model-based fault diagnosis methods for power systems are facing challenges, and therefore, inapplicable for timely analysis, and the accuracy of fault diagnosis needs to be improved at the same time.

Aiming to optimize the performance of existing methods and improve the speed and accuracy of fault diagnosis, a methodology of fault diagnosis for power systems is proposed. This book is mainly focused on the performance optimization of fault diagnosis methods for power systems including both model-driven ones, such as the convolutional neural network, and data-driven ones, such as random matrix theory. Studies on fault diagnosis of power systems have long been the focus of electrical engineers and scientists. Pursuing a holistic approach to improve the accuracy and efficiency of existing methods, the underlying concepts of several algorithms are introduced and then further applied in various situations for fault diagnosis of power systems in this book. The primary audience for the book would be the scholars and graduate students whose research topics include the control theory, applied mathematics, fault detection and so on.

Wuxi, China
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Dinghui Wu
Juan Zhang
Junyan Fan
Dandan Tang

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Acronyms

CNN	Convolutional neural network
ESN	Echo state network
RMT	Random matrix theory