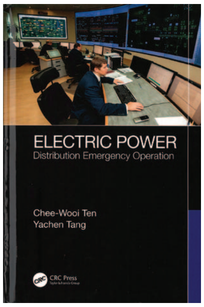
by Marian Kazmierkowski and Fernando A. Silva

Electric Power: Distribution Emergency Operation



By Chee-Wooi Ten and Yachen Tang, CRC Press (Taylor & Francis), 2018, hardback, 246 pages, ISBN 978-1-4987-9894-5.

In recent years, huge natural events, such as hurricanes, cyclones, typhoons, earthquakes, and tsunamis, have destroyed or severely damaged many man-made structures and facilities. Electrical energy distribution systems are especially vulnerable to such events. Winds in excess of 200 km/h can wreck transmission towers, flatten concrete and wooden power poles, snap or entangle power lines, and destroy wind and solar farms. Meanwhile, heavy rains and giant waves can swamp and destroy power plants. Many predict that these events are likely to become more frequent as ocean temperatures and sea levels continue to rise.

Electrical engineers at their control desks need to be prepared for such threats. Their mission is to stop the spread of small local power-distribution outages triggered by natural disasters before the outages turn into a total blackout.

The timely book *Electric Power: Distribution Emergency Operation* was designed to aid in this mission. Part I begins by reviewing the state of the art of communication architectures for distribution networks, including the communications from distribution dispatching centers, pole-mounted feeder devices, and substation remote terminal devices. In extreme emergencies, like natural disasters, the engineer in the control room will not have access to all of the resources normally available. Therefore, a deep understanding of the whole communication and distribution infrastructure is fundamental.

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Part II provides methods for data preparation and modeling for operation. It explains how geographic information system (GIS) data sets can be extracted and transformed to incidence and adjacency matrixes, which are then used to analyze the distribution subsystem energization state, a new concept introduced in this book. Part III describes unbalanced three-phase distribution power flow, a tool for further fault identification and isolation and temporary service restoration. Part IV explains concepts related to outage management, crew coordination, trouble tickets, and switching procedure management within the emerging development of networked microgrids. In the context of making power-distribution systems more resilient in the face of both natural disasters and cyberattacks, the authors discuss graph modeling, energization status, and reconfigurability.

The book's four parts and nine chapters are arranged in the following manner:

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4.2) "Calculation Methods About Power Flow Analysis"
4.3) "Power Flow Analysis for Feeder Switching Operations"
4.4) "Available Metering Sources Within Distribution Feeders"
4.5) "Data Structure for Power Flow"
4.6) "Flipping Between Normally Closed (NC) & Normally Open (NO) Switches"
4.7) "Conclusions"

5) "Fault Identification Based on Segment Localization"
5.1) "Reserve Engineering—Short Circuit Analysis"
5.2) "Availability of Fault Indicators on Pole-Mounted Switches"
5.3) "Ideal Scenario—All Switches Are Remote-Controlled"
5.4) "Conclusions"

6) "Isolation of Faulted Segment and Partial Restoration"
6.1) "Operating States"
6.2) "Fault Management Systems"
6.3) "Graph Based Fault Isolation"
6.4) "Temporary Service Restoration"
6.5) "Conclusions."

Part IV Outage Coordination and Correlation

7) "Customer Relational Database"
7.1) "Introduction To Advance Metering Infrastructure (AMI)"
7.2) "Customer Information System"
7.3) "Trouble Call Tickets"
7.4) "Outage Escalation"
7.5) "Conclusions"

8) "Outage Management"
8.1) "Outage Management System"
8.2) "Crew Coordination"
8.3) "Scenarios for Outage Management"
8.4) "Energization States of a Sub-System"
8.5) "Evaluation of Reliability Indices"
8.6) "Conclusions"

9) "Switching Procedure"
9.1) "Scheduled Outage"
9.2) "Switching Procedure for Scheduled Outage"
9.3) "Fraud Detection"
9.4) "Conclusions."

The book also includes a table of contents, a preface, acknowledgments, a glossary, a guide to acronyms, author biographies, a bibliography, and an index.

Coauthor Chee-Wooi Ten (a Senior Member of the IEEE) is an associate professor of electrical and computer engineering at Michigan Technological University, Houghton. He was involved in project development for distribution management systems with Siemens Energy Management and Information System in Singapore from 2002 to 2006. His research interests include modeling for interdependent critical cyberinfrastructures and supervisory control and data-acquisition automation applications for power grids.

Coauthor Yachen Tang is with Global Energy Interconnection Research Institute North America in San Jose, California. He earned his Ph.D. degree in electrical and computer engineering from Michigan Technological University, Houghton, in 2018. His research interests include power-grid cybersecurity, encompassing issues ranging from modeling of anomalies to interference of inconsistent data related to distribution systems, data mining, and machine learning.

Electric Power: Distribution Emergency Operation is of paramount importance for electrical-distribution engineers preparing measures for emergency operation of distribution grids. The book is also suited for graduated students for follow-up guidance in managing distribution networks under emergency operation. It is a valuable tool for teachers instructing about engineering in disasters and emergencies, researchers, practicing professionals, and advanced students needing to understand and master the operation of power-distribution systems following natural or man-made disasters.

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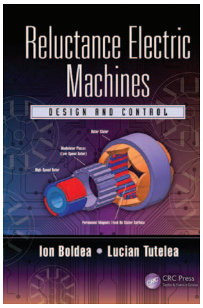
Reluctance Electric Machines: Design and Control



By Ion Boldea and Lucian Tutelea, CRC Press (Taylor & Francis Group), 2018, hardback, 416 pages, ISBN-13: 978-1-4987-8233-3.

This, book, the 26th written or cowritten by Prof. Ion Boldea [1], entered the publishing market at the perfect time, just as the rapid development of electromobility was reviving interest in synchronous reluctance motors. Rare earths are essential in synchronous motors with permanent magnets, the kind of motor generally favored for electric cars. People in the industry are apprehensive that, with mass production of electric cars, the price of such scarce magnetic materials will skyrocket. This fear has reignited interest in simple and inexpensive induction motors, which don't require such material. However, these motors have higher losses and, therefore, are less efficient than reluctance synchronous motors. Still, a new examination of the topic is warranted. This new book (another on the same topic by Prof. Boldea was published in 1996 [2]) is an overview of various types of reluctance electrical machines and elements of their modeling, design, and control. It describes reluctance electrical machines by classification. The following types of machines are covered:

- reluctance synchronous machines
- brushless dc multiphase reluctance machines
- claw pole–synchronous motors
- switched reluctance machines
- Vernier permanent-magnet machine drives

THE BOOK LISTS, IN ADDITION TO THE OPERATIONAL FEATURES, THE COSTS OF MACHINE ELEMENTS AND HOW THOSE ELEMENTS AFFECT MACHINE CONSTRUCTION.

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