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Power Systems Amid the 4th Industrial Revolution

Editors:

Diaa-Eldin A. Mansour, Faculty of Engineering, Tanta University, Tanta, Egypt

Mohamed Gamal Hussien, Faculty of Engineering, Tanta University, Tanta, Egypt

Partha Sarathi Subudhi, Bajaj Institute of Technology, Wardha, Maharashtra, India

A. Rakesh Kumar, KPR Institute of Engineering and Technology, India

Sanjeevikumar Padmanaban, University of South-Eastern Norway, Norway.

This book discusses the operation of power systems amid the 4th industrial revolution and the value of Industry 4.0 technologies to grid operators and end customers.
The concept of smart grids was introduced years ago, but their practical implementation into power grids was delayed as the information communication technology infrastructure was not ready. The transition to smart grids can be put into three dimensions: decentralization, decarbonization, and digitalization. Industry 4.0 technologies can enable more advanced features that can add value to all parties in smart grids and achieve a more holistic efficiency increase for the entire system via accomplishing business goals and realizing technical requirements.

Technical topics discussed in the book include:

- Structure of the generalized IoT value chain and IoT applications for low carbon technologies.
- Topological improvement of electrical equipment to facilitate a smooth transition to the smart grid infrastructure.
- Improvement of techniques to tackle advanced power system problems such as energy management, power equipment diagnostics, and renewable energy integration.
- Modeling, simulation, and analytic tools for cyber-attacks and cyber security actions for current cyber-physical power systems.
- Artificial intelligence, big data, and machine learning application to power system problems.
- Intelligent controllers for an advanced residential system.

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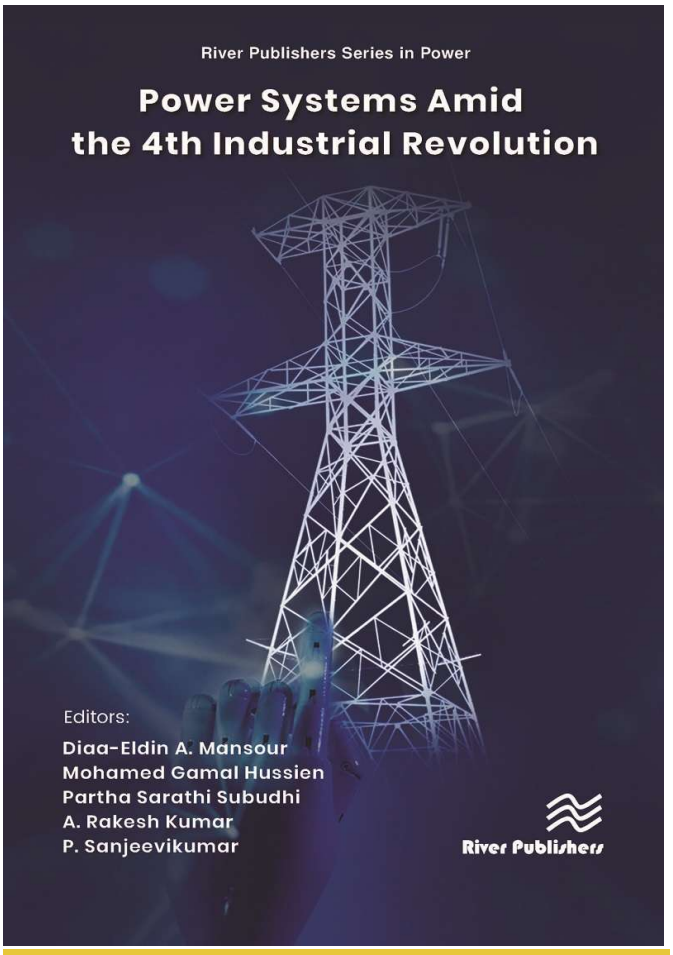

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