

THE FIRST GUIDE TO THE DESIGN AND MODELING OF SMART GRID ENERGY SYSTEMS

As we begin the second decade of the 21st century and approach the problem of global warming, we need to accept a fundamental change in how we create, generate, distribute, and use energy. Creating sustainable energy, thereby reducing or eliminating our carbon footprint and efficiently utilizing available energy resources, is of vital importance. Smart grid renewable energy systems are a revolutionary concept in electrical engineering designed to allow end users control over their individual energy needs by providing them with the means to create, maintain, and distribute energy.

Design of Smart Power Grid Renewable Energy Systems uniquely addresses the design and modeling of smart grid renewable energy systems by integrating three areas of electrical engineering: power system engineering, power electronics, and electric energy conversion systems—with an approach that differs from classic methods. After a brief overview of energy and its evolution to electric power, the author introduces the basic concepts behind power grids, then takes an in-depth look at the modeling of converters in power grid distributed generation systems and the design of a smart power grid system. Microgrid photovoltaic and wind energy systems are addressed as renewable energy sources. Load flow analysis of power grids and microgrids, and power grid fault studies are the subjects of the text's final chapters.

In each chapter, Dr. Keyhani presents a key engineering problem and subsequently formulates a mathematical model of the problem followed by a simulation testbed in MATLAB®, highlighting solution steps. Each chapter includes a number of solved examples, problems, and related references.

Design of Smart Power Grid Renewable Energy Systems is written as an undergraduate/graduate textbook for introducing renewable energy sources and the basic concept of smart power grids for students in electrical and mechanical engineering. The book is also a useful reference tool for researchers and energy policy makers.

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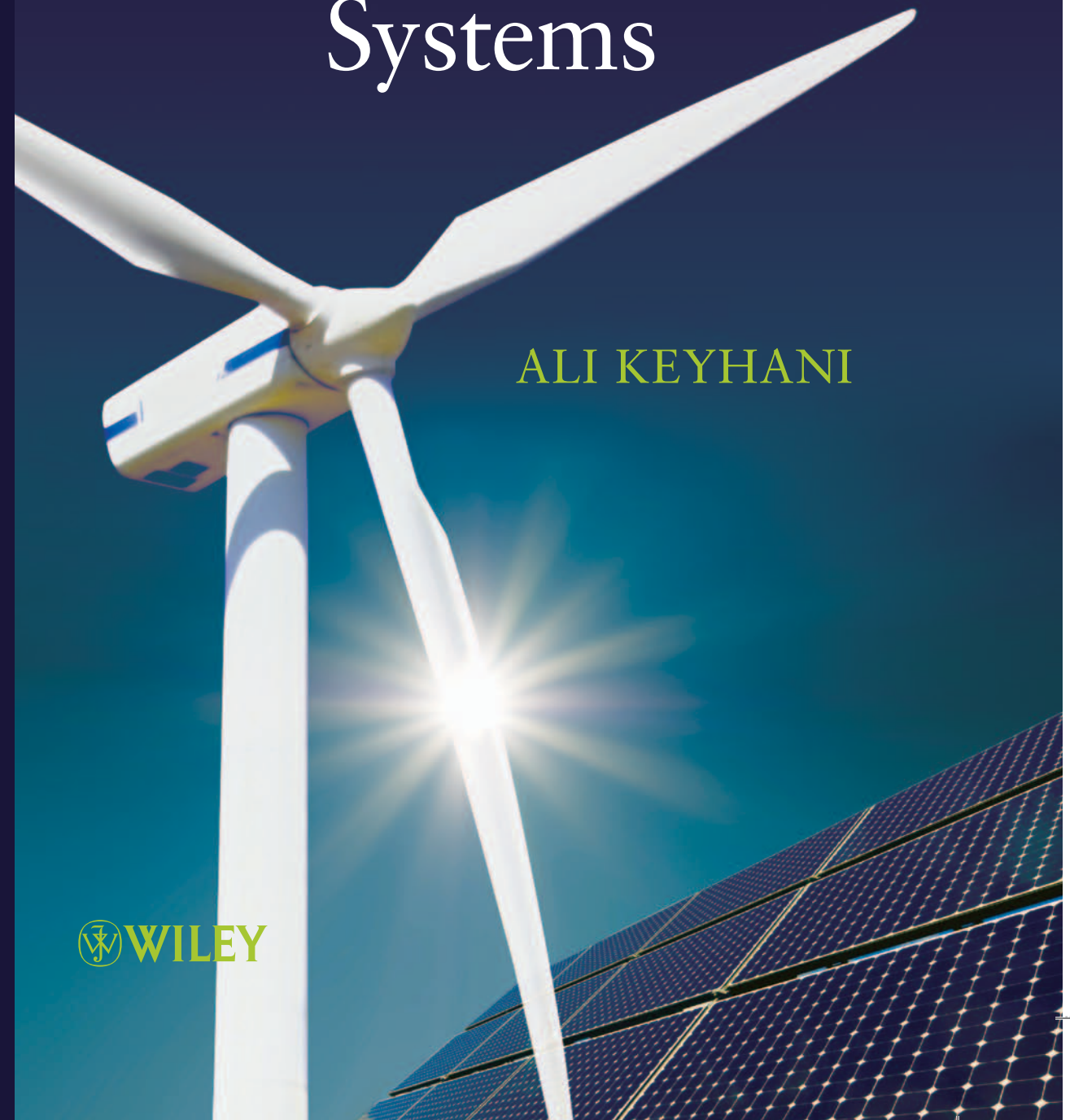
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