Description:

The most comprehensive analysis available on various practical wind energy systems.

Wind energy is one of the fastest growing renewable energy resources of the past decade. This book is dedicated to the state-of-the-art power conversion and control of wind energy conversion systems (WECS) from an electrical engineering perspective, providing a thorough analysis of wind generators, system configurations, power converters, control schemes, and dynamic/steady-state performance of various practical wind energy systems.

The book begins with market survey, wind turbine technology, wind energy system classifications, and grid codes for wind power integration. The fundamentals of wind energy systems are reviewed, as are commonly used wind generators. The book goes on to discuss various power converters for wind energy conversion and characteristics of major WECS, including fixed-speed induction generator, variable-speed squirrel cage induction generator, doubly fed induction generator, and synchronous generator based wind energy systems.

Throughout, important concepts are illustrated with simulations and experiments, and design guidance is provided with tables, charts, and graphs. To help the reader understand the principle and operation of various WECS, more than 30 case studies are given in various chapters and more than 100 solved problems are included in a dedicated appendix. This book not only serves as a valuable reference for academic researchers, practicing engineers, and consultants, but also as a textbook for graduate and senior-year undergraduate students.

"... this book is extremely important and very timely. It is expected to be of wide demand in the world. ... It gives comprehensive and in-depth analysis on wind generators, power converters, and control systems of various types of wind generation systems. ... The book is very well organized with physical explanations, mathematical analysis, computer simulations, experimental results, and worked-out examples. ... It is a unique book with optimal balance of theory and practical discussion." Dr. Bimal K. Bose, Condra Chair of Excellence/Emeritus in Power Electronics, University of Tennessee

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