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Nota di contenuto	Cover; Title Page; Copyright; Contents; Preface; Notation; Chapter 1 Wind Energy Power Plants; 1.1 Wind Turbine Structures; 1.2 A Brief History; 1.3 Milestones of Development; 1.4 Functional Structures of Wind Turbines; References; Chapter 2 Wind Energy Conversion Systems; 2.1 Drive Torque and Rotor Power; 2.1.1 Inputs and outputs of a wind turbine; 2.1.2 Power extraction from the airstream; 2.1.3 Determining power or driving torque by the blade element method; 2.1.4 Simplifying the computation method; 2.1.5 Modeling turbine characteristics; 2.2 Turbines; 2.2.1 Hub and turbine design 2.2.2 Rotor blade geometry 2.3 Power Control by Turbine Manipulation; 2.3.1 Turbine yawing; 2.3.2 Rotor blade pitch variation; 2.3.3 Limiting power by stall control; 2.3.4 Power control using speed variation; 2.4 Mechanical Drive Trains; 2.5 System Data of a Wind Power Plant; 2.5.1 Turbine and drive train data; 2.5.2 Machine and tower masses; 2.5.3 Machine costs; References; Chapter 3 Generating Electrical Energy from Mechanical Energy; 3.1 Constraints and Demands on the Generator; 3.2 Energy Converter Systems; 3.2.1 Asynchronous generator construction;

3.2.2 Synchronous generator construction
 3.3 Operational Ranges of Asynchronous and Synchronous Machines
 3.4 Static and Dynamic Torque; 3.4.1 Static torque; 3.4.2 Dynamic torque; 3.5 Generator Simulation; 3.5.1 Synchronous machines; 3.5.2 Asynchronous machines; 3.6 Design Aspects; 3.6.1 Asynchronous generators; 3.6.2 Synchronous generators for gearless plants; 3.6.3 Multi-generator concept (Dissertation A. Ezzahraoui); 3.6.4 Ring generator with magnetic bearings (Dissertation K. Messol); 3.6.5 Compact superconductive and other new generator concepts; 3.7 Machine Data; 3.7.1 Mass and cost relationships
 3.7.2 Characteristic values of asynchronous machines 3.7.3 Characteristic values of synchronous machines; References; Chapter 4 The Transfer of Electrical Energy to the Supply Grid; 4.1 Power Conditioning and Grid Connection; 4.1.1 Converter systems; 4.1.2 Power semiconductors for converters; 4.1.3 Functional characteristics of power converters; 4.1.4 Converter designs; 4.1.5 Indirect converter; 4.1.6 Electromagnetic compatibility (EMC); 4.1.7 Protective measures during power conditioning; 4.2 Grid Protection; 4.2.1 Fuses and grid disconnection; 4.2.2 Short-circuiting power
 4.2.3 Increase of short-circuit power 4.2.4 Isolated operation and rapid auto-reclosure; 4.2.5 Overvoltages in the event of grid faults; 4.3 Grid Effects; 4.3.1 General compatibility and interference; 4.3.2 Output behavior of wind power plants; 4.3.3 Voltage response in grid supply; 4.3.4 Harmonics and subharmonics; 4.3.5 Voltage faults and the fault-ride-through (FRT); 4.4 Resonance Effects in the Grid During Normal Operation; 4.5 Remedial Measures against Grid Effects and Grid Resonances; 4.5.1 Filters; 4.5.2 Filter design; 4.5.3 Function of harmonic absorber filters and compensation units
 4.5.4 Grid-specific filter layout

Sommario/riassunto

"This timely update provides detailed treatment of the integration of wind power into electrical power systems, including brand new material on offshore wind power farms and technologies This third English edition is based on new material from the fourth and fifth German editions (Windkraftanlagen: Systemauslegung, Netzintegration und Regelung, 5. Auflage, published by Teubner B.G. GmbH, July 2009). It answers the question of how, with the proper control and direction, wind turbines can be made to operate more similarly to conventional power plants. The revised third edition addresses the engineering challenges of cost effective transmission and distribution of wind power, such as technical, economic and safety issues. It also incorporates all the recent technical developments in electrical power conversion systems and essential operating conditions, and includes unique, original research findings carried out by the author's own PhD and Masters students at Kassel University, Germany. This popular reference book has been updated to include new material from the fourth and fifth German editions, equating to 12.5% brand new material New material covers the 'hot topic' of grid connection for offshore wind farms and offshore technologies, including lots of illustrations Brand new material on low voltage fault dynamics and control of turbines Includes up-to-date coverage on completely new generator developments for wind turbines, developed over the past two years Illustrates how wind turbines can operate like conventional power plants using advanced control systems. Discusses the profitability of wind turbine integration in electrical power grids, and the environmental impact "--
 "New material covers the 'hot topic' of grid connection for offshore wind farms and offshore technologies, including lots of illustrations"--
