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Autore	Wang Tongguang
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Nota di contenuto	Part 1: Fundamental aerodynamics of wind turbines -- 1 Physical properties of air -- 2 Fundamental aerodynamics -- 3 Basic knowledge of airfoil -- Part 2: Blade element momentum method -- 4 Classical Blade element momentum method -- 5 Correction models -- 6 Unsteady blade element momentum method -- Part 3: Vortex wake Method -- 7 Fundamental theory of vortex -- 8 Vortex wake model -- 9 Performance of wind turbine -- Part 4: Computational Fluid Dynamics Method -- 10 Foundation of Computational Fluid Dynamics -- 11 Numerical simulation of wind turbine aerodynamic performance -- 12 Large-eddy simulation and detached-eddy simulation of wind turbine

aerodynamics.

Sommario/riassunto

This book deals with horizontal-axis wind turbine aerodynamic performance prediction methods. It focuses on the traditional and newly-developed methods for the wind turbine aerodynamic performance calculation. The fundamental theories of fluid mechanics essential for understanding the other parts of this book are firstly introduced in Part I, followed by the blade element momentum theory in Part II, with special attentions to a systematic review of various correction models. Part III is mainly about the prescribed and free vortex wake methods, while the state-of-art computational fluid dynamics (CFD) methods are detailed in Part IV. Part III thoroughly describes the prescribed and free vortex wake methods which are still of great importance towards realistic investigation of wind turbine performance. Despite the highly computational cost, the CFD methods in Part IV have received increasing interest from the academic community since they provide more detailed information about the flow field around the wind turbine. This has shed a light in combination with the correction models introduced in Part II on more advanced research for wind turbine. This book is intended for researchers and students interested in aerodynamics of wind turbine and is particularly suitable for practicing engineers in wind energy. Readers can gain a comprehensive understanding in both classical and up-to-date methods for the study of wind turbine aerodynamics. The authors hope that this book can promote the research and development of wind turbines.