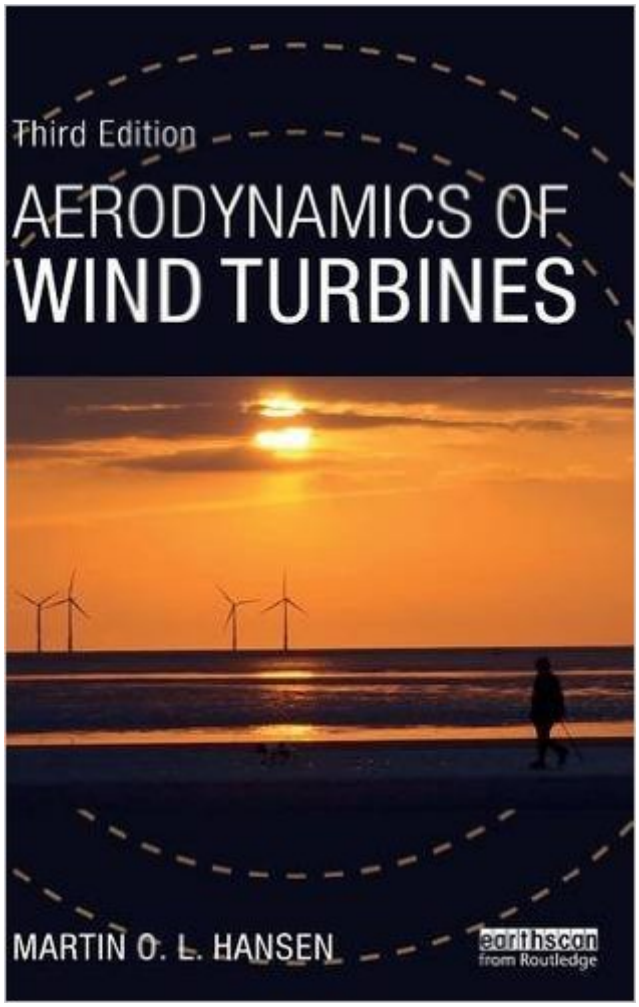
Aerodynamics Of Wind Turbines



Synopsis

Aerodynamics of Wind Turbines is the established essential text for the fundamental solutions to efficient wind turbine design. Now in its third edition, it has been substantially updated with respect to structural dynamics and control. The new control chapter now includes details on how to design a classical pitch and torque regulator to control rotational speed and power, while the section on structural dynamics has been extended with a simplified mechanical system explaining the phenomena of forward and backward whirling modes. Readers will also benefit from a new chapter on Vertical Axis Wind Turbines (VAWT). Topics covered include increasing mass flow through the turbine, performance at low and high wind speeds, assessment of the extreme conditions under which the turbine will perform and the theory for calculating the lifetime of the turbine. The classical Blade Element Momentum method is also covered, as are eigenmodes and the dynamic behaviour of a turbine. The book describes the effects of the dynamics and how this can be modelled in an aeroelastic code, which is widely used in the design and verification of modern wind turbines. Furthermore, it examines how to calculate the vibration of the whole construction, as well as the time varying loads and global case studies.

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