

وبینار علمی

Webinar in Mechanical engineering

Unsteady Aerodynamics and Dynamic Response of Wind Turbines

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Increasing rotor hub height and extending the length of wind turbine rotor blades are amongst the trends to increase the capture of offshore wind energy by accessing higher wind speeds and increasing the available wind power. As a result of these design strategies, larger commercial wind turbines that have a substantially lower cost of wind-generated electricity, experience wider ranges of atmospheric conditions and consequently more fatigue loads.

A novel opto-mechanical platform (OMP) to measure the dynamic response of a full-scale multi-megawatt wind turbine is developed and applied. This opto-mechanical platform measures the blade shape, blade deflections, and characteristics of blade vibrations by tracking the blade during operation without the need for any modification or attachment to the turbine. Simultaneous measurements of the wind speed, wind direction, and turbulence intensity are made with a LiDAR scanning system. It is shown that there is an azimuthal variations of wind speed and turbulence during a rotor revolution, which consequently leads to azimuthal variations of fatigue loads during a rotor revolution.



Dr. Hadi Hoghooghi received his B.Sc. degree in Mechanical Engineering from Isfahan University of Technology in 2012, and his M.Sc. in Mechanical Engineering (Energy Conversion Division) from Sharif University of Technology in 2015. He was the project manager of a national master plan entitled "Design, prototyping, and testing of Pelton, Banki, and Kaplan turbines for micro-hydropower plants in Iran" from 2015 to 2017 at Durali System Design and Automation center at Sharif University of Technology. He recently finished his Ph.D. in Mechanical Engineering at ETH Zürich in Switzerland. His research interests are Aerodynamics, Renewable Energies (Windpower, Hydropower), Turbomachinery, Propulsion, and Computational and Experimental Fluid Dynamics.



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