Analysis of the aerodynamic damping in the modal parameter estimation of wind turbines

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Abstract

In this paper we propose a procedure to estimate the modal parameters of a Wind Turbine working at rated power, but for different wind speeds. The effects of harmonic excitations are first removed by a novel method already proposed by the authors and then Randomdec signatures are calculated on signal frames sharing similar conditions in terms of mean value and deviation of wind. In this way we can track the influence of aeroelastic effects to the estimation of damping. The analysis has been tested on the well known NREL model of a 5MW Wind Turbine.

Keywords: Wind turbines, Aerodynamic damping, harmonic removal, modal analysis, OMA

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