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**The Natural Excitation Technique (NExT)
for Modal Parameter Extraction From
Operating Wind Turbines**

by

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ABSTRACT

The Natural Excitation Technique (NExT) is a method of modal testing that allows structures to be tested in their ambient environments. This report is a compilation of developments and results since 1990, and contains a new theoretical derivation of NExT, as well as a verification using analytically generated data. In addition we compare results from NExT with conventional modal testing for a parked, vertical-axis wind turbine, and, for a rotating turbine, NExT is used to calculate the model parameters as functions of the rotation speed, since substantial damping is derived from the aeroelastic interactions during operation. Finally, we compare experimental results calculated using NExT with analytical predictions of damping using aeroelastic theory.

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