

Abstract Submitted  
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**A Nonlinear Model for Wind-Induced Oscillations of Open-Grown Trees** LAKSHMI NARAYANAN RAMANUJAM, MARK REILAND, YAHYA MODARRES-SADEGHI, BRIAN KANE — Wind-induced oscillations of trees constitute a traditional fluid-structure interaction problem. The highly nonlinear interaction between fluid and structure makes the prediction of such oscillations very challenging. We use a nonlinear analytical model to predict the wind-induced oscillations of the open-grown trees, by taking into account the geometrical as well as fluid-related nonlinearities. We validate this model using a series of experimental measurements of the amplitudes and frequencies of oscillations for the red pine trees at various wind speeds. Then we use this model to study the influence of several parameters such as tree stiffness, drag coefficient, canopy density, etc. on the resulting wind-induced oscillations.

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