

Vortex induced vibrations (VIV) in rotating blade structures

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Abstract: Aerodynamic forces play an important role in rotating structures like helicopter blades or wind turbines. They may lead to complex dynamics if flutter condition arises. In this paper we consider model of a rotating composite blade deformed by flow pressure. These deformations influence airflow and composite blade vortex induced vibrations. Therefore, Fluid-Structure Interactions (FSI) analysis is needed to evaluate rotating blade and accompanying effects. In the analytical part of this paper Euler-Bernoulli beam theory is used for the composite beam and Van der Pol equation is applied to represent the vortex induced vibrations. The influence of fluid flow and composite blade vibrations are investigated in this study.

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