

SLENDER BEAM PROBLEM UNDER AERODYNAMIC COUPLING

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Abstract

The differential equations for the coupled vibrations of a slender beam under aerodynamic coupling including the effect the tensile force are obtained. A method based on series solution is used to obtain the critical speed of the steady flow and the corresponding fundamental frequency of vibrations. The analysis is presented in this paper considers vibrations of a slender beam that could represent the turbine blade of simple geometry. The oscillation of the beam whose elastic axis and the lines of centre of gravity donot coincide is always coupled. The beam is attached to a disc of radius r_0 and disc rotates with angular velocity Ω .

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