

The effect of the fiber orientation of composites on free vibration analysis of aircraft structures

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The beam is the model most used in structural analysis. This model is effective for preliminary design of aerospace structures (aeroelasticity, dynamic response, optimization, etc). New materials or composites have a high relationship between the bending and torsion modes due to their anisotropies. The purpose of this study is to show the influence of bending-torsion coupling K on modal analysis of aircraft structures by using FEM modeling. The bending-torsion coupling coefficient considered here is depended to the fiber orientation of laminated composite materials. The Energy method is used to derive the basic mass and rigidity matrices of the beam where the stiffness matrix contains terms of bending-torsion coupling. An application for free vibration analysis of aircraft wing is validated in this study and it's generalized to aircraft structure model.

Biography

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