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Time-domain aeroelastic analysis of agard 445.6 Wing

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A coupled computational fluid dynamic (CFD) and computational structural dynamics (CSD) method is developed for the simulation and prediction of flutter of an aircraft wing. The CFD solver is based on an unsteady transient flow finite volume algorithm for the Navier–Stokes's equations. The CSD solver is based on the time integration of modal dynamic equations extracted from full finite element analysis. A general remeshing and spring analogy mesh deformation methods are used to generate dynamically moving grids for the unsteady flow solver. The solutions of the flow- field and the structural dynamics are coupled strongly in time domain by a fully implicit method. The coupled CFD–CSD method simulates the aeroelastic system directly on the time domain to determine the stability of the aeroelastic system. Based on the commercial solvers with available capability we have setup loosely coupled an aeroelastic analysis method for complete fluid structure interaction and also a closely coupled method to compute and compare the results with each other and also with the experimental data. Computations are performed for the three-dimensional AGARD 445.6 wing. Flutter boundary and transonic dip curve predictions by both the coupled CFD–CSD methods is presented and compared with experimental data for the wing.

Biography

Parameshwar banakar is Assistant Professor at Department of Aeronautical Engineering at Kls gogte institute of technology, Udyambag, Belagavi.

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