GROUND VIBRATION TEST BASED FLUTTER PREDICTION FOR A COMBAT AIRCRAFT

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Abstract

This paper compares the flutter characteristics of a combat aircraft predicted using experimental modal parameters from ground vibration tests with the results obtained by flight flutter tests. An equivalent finite element model representing the test points in ground vibration tests has been developed and further refined to obtain a finite element model with fine mesh encompassing the entire lifting surface areas. Infinite plate interpolation scheme has been used to extrapolate the eigenvectors for the refined model. A Direct Matrix Abstraction Program (DMAP) written in NASTRAN replaces the generated mass normalized eigenvalues and vectors of the refined model from a dynamic analysis in NASTRAN, with the experimentally obtained eigenvalues and extrapolated eigenvectors. Flutter analysis has been carried out with the replaced experimental modal parameters in subsonic, transonic and supersonic regimes using flutter modules in NASTRAN and ZAERO software. The results obtained using this procedure have been compared with the flight flutter test results. The dispersion in the damping and frequency results obtained from computations and the flight flutter tests were within acceptable limits showing a good correlation.

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