Study on the Effect of Composite Wing Layer Parameters on Flutter Velocity

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ABSTRACT

With the rapid development of composite materials, composite materials are widely used in aircraft. Anisotropy of Composite Materials brings unprecedented opportunities and challenges to aeroelastic design of aircraft, which also brings new problems to flutter analysis of aircraft. This paper established a finite element simulation model of composite wing by using the aeroelasticity theory. Based on the variety of the composite structures, by changing the ratio of plies, the effects of different ratio of plies on flutter speed are analyzed. Further analysis revealed that the change of bending-torsion frequency ratio of composite wing results in the change of flutter speed. Based on the unsteady aerodynamic theory, two-dimensional wing model is established. The flutter calculation of the model is carried out by using the V-g method. The effect of bending-torsion frequency ratio on flutter velocity is verified theoretically. Comprehensive analysis of simulation analysis and theoretical research, finding that aerodynamic elasticity tailor optimum design of composite is feasible by changing the ratio of plies.

References

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