

Flutter Modes Control of Plates Using Macro-Fiber-Composite Actuators

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ABSTRACT

The purpose of this study is to reduce the flutter vibrational modes of plates using Macro Fiber Composite (MFC) actuators. To achieve this goal and avoid causing structural damage in any vibration mode, the additional damping and external shunt circuits are added to consume the energy when the bending and twisting mode vibrations occur. In this study, three control techniques are utilized. The first is active control method, a velocity-feedback system with a laser displacement meter, a low-pass filter, a voltage amplifier and MFC actuators is applied to reduce vibration. The second is passive control method, the MFC actuators, R-shunt and RL-shunt are constructed to consume the vibrational energy resulting in vibration attenuation. The last is the hybrid control method which combines with active and passive control methods. Finally, the results of three techniques are compared in order to realize the performance in flutter attenuation.

Keywords : Plates、 MFC actuators、 Shunt circuits、 Flutter reduction、 Hybrid control

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