Abstract

The present paper is aimed at active suppression of flexural vibration of thin symmetrically laminated plate by means of piezoelectric of sensor and actuator patches, which operate in LQG-Kalman control and using system equivalent reduction expansion process (SEREP). The study combinate the FE modeling, the Kalman-LQG control method with the reduced order model for controlling the plate. By reducing the full order state space resulting from FE modeling to lower subspace, the combination minimizes time of simulation using few degrees of freedom of the considered FE and help to implement easily the control without risk of divergence or failure and without changes in the dynamical characteristic of the studied vibrating plate.

The active vibration control of a composite Kirchhoff plate using piezoelectric layers has been investigated. A discrete finite element model (plate-sensors-actuators) to the mass and stiffness of the plate was used to derive the state space equations. A global procedure based on LQG-Kalman-Reduced Process is developed to verify the performance of the method. A numerical simulation of a composite flexible plate is accomplished to investigate the effectiveness of the used control technic under mechanical and thermal disturbances.

Biography (200 word limit)

Mustapha SANBI is full professor at department of mechanical engineering, National School of Applied Sciences ENSA, Abdelmalek Essaadi University, Tetuan, Morocco. His main areas of interest are smart structures modeling, active control and multi-physics coupling.

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