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Vibration Control of a Flexible Structure Using MFC Actuator

Authors : Jinsiang Shaw, Jeng-Jie Huang

Abstract : Active vibration control is good for low frequency excitation, with advantages of light weight and adaptability. This paper employs a macro-fiber composite (MFC) actuator for vibration suppression in a cantilevered beam due to its higher output force to reject the disturbance. A notch filter with an adaptive tuning algorithm, the leaky filtered-X least mean square algorithm (leaky FXLMS algorithm), is developed and applied to the system. Experimental results show that the controller and MFC actuator was very effective in attenuating the structural vibration. Furthermore, this notch filter controller was compared with the traditional skyhook controller. It was found that its performance was better, with over 88% vibration suppression near the first resonant frequency of the structure.

Keywords : macro-fiber composite, notch filter, skyhook controller, vibration suppression
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