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Small Amplitude Vertical Vibration Control for Seat in Vehicle

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Abstract

An application of active vibration control (AVC) techniques for reducing undesired small amplitude vertical vibration in automobile driver's seat is present in this paper. Three different control structures are applied and compared in the experimental works. Apart from adaptive and feedback control system, a hybrid controller which is a combination of the adaptive control with filtered-x least mean squares (FXLMS) algorithm and feedback structure with robust synthesis theory for obtaining the robust performance is proposed. A frequency domain technique is used for achieving the objective of system identification and controller design. The proposed AVC controllers are implemented in digital signal processor (DSP) platform for real time control. Experiments are carried out to evaluate the proposed AVC system for reducing the small amplitude vertical vibration of experimental seat. The results of experiment indicate that the hybrid technique is the most effective in reducing the vibration of experimental platform. The comparison and discussion of the proposed controllers are also described in this paper.

Key words : Adaptive control; H infinity control; Robust control; Digital signal processor