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Abstract
This thesis is a research of active vibration control system incorporated with passive isolation system. Vibration acceleration acquired from an accelerator is fed into the controller as an input signal, and a voice coil actuator arranged parallel with spring produces control force. The first step of this research is to develop theoretical equations which govern the system vibration, and discuss the effect on the active vibration control system due to different proportional coefficients. Then, a proportional controller installed in PC is applied to suppress the natural frequency resonance of passive isolation system in experiment. The result shows that the proposed method can reduce the vibration level about 20 dB. Next, an adaptive control method is studied to cancel the disturbance induced by moving element on passive isolation system. The experiment result shows that the disturbance at frequency range between 8 and 80 Hz can be reduced efficiently by adaptive control. Finally, the combination of adaptive control and proportional control are applied to develop the control algorithm in DSP to suppress the disturbance and natural frequency oscillation simultaneously, and the efficiency is verified experimentally.
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