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Abstract
This dissertation mainly investigates adaptively active noise control in a duct, and based on adaptive control theory and system identification technology to develop a frequency domain Filtered-X LMS algorithm. In the frequency domain Filtered-X LMS algorithm, the updating of control parameter is executed through each band in frequency domain, while the control process is carried out in time domain to reflect real-time characteristics. The optimal collocated positions of secondary source and two microphones are studied and the theoretical equations that reduce the influence of acoustic feedback are developed based on plane wave transmission theory of sound in a duct. In experiment, we use LabVIEW programming language to carry out the theoretical equations of acoustic feedback cancellation and incorporate frequency domain Filtered-X LMS algorithm. The results showed that the method of acoustic feedback cancellation incorporated with the frequency domain Filtered-X LMS algorithm can effectively reduce the influence of acoustic feedback, and rapidly attain steady convergence and good control performance of suppressing low frequency noise in a duct.
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