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Adaptive active noise control incorporating with a transfer function method for reducing acoustic feedback in a duct

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In most practical applications of active noise control, the acoustic feedback is a major problem that often interferes with the operation of the control system and even renders it unstable. We propose a frequency-domain method based on transfer function to reduce the influence of acoustic feedback based on plane wave transmission theory of sound in a duct. The original signal of primary noise is obtained from the measured signals of reference microphone and error microphone which are transformed to frequency domain by FFT and operated by the proposed method. In this study, Filtered-X LMS algorithm is applied to carry out the active noise controller incorporating with this transfer function method. Experimental results of active noise control show that the system has achieved 18.5 dB maximal attenuation in the frequency band 200∼600 Hz. On the contrary, it's only attenuate 3∼4 dB if acoustic feedback is present. Therefore, it was to verify that the proposed method of acoustic feedback cancellation incorporating with the Filtered-X LMS algorithm can effectively reduce the influence of acoustic feedback and obtains a better performance of active noise control in a duct.