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應用於汽車音響系統之適應性串音消除  
A Study of Adaptive Crosstalk Cancellation for Vehicle Audio Systems

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中文摘要

本研究發展兩個適應性串音消除濾波演算法應用於汽車音響系統，串音效應是指當由不同位置的音響喇叭所發出之聲音經過不同之傳遞路徑傳到駕駛者耳朵有時間差之效應，進而影響到聽覺的品質。串音消除的目的是要傳遞最佳的聲音，消除串音效應，大部分的傳統串音消除演算法主要是使用最小平方誤差之適應性濾波器，然而當聲源是變動的，其收斂速度和性能是受到限制的，本研究提出可變收斂因子最小平方誤差法和卡門濾波演算法改善車廂串音消除的性能，本文將比較提出之演算法與傳統最小平方誤差演算法之性能。

關鍵字：串音消除;適應性濾波器;汽車音響系統

Abstract

In the present study, two adaptive filtering algorithms for acoustic crosstalk cancellation in vehicle audio systems are developed and compared. Acoustic crosstalk is always occurs in a multiple loudspeakers system when sound transmit from right loudspeaker to left ear and vice versa. The purpose of crosstalk cancellation is to deliver the desired signals exactly at the listener's ears and eliminate the undesired sound. Most of the conventional algorithms for acoustic crosstalk cancellation in an audio system are based primarily on an adaptive filter with the least-mean-square (LMS) error algorithm. However, convergence speed and performance are often limited when an audio source is varied. In the present study, an adaptive variable step-size least-mean-square (VSS LMS) error algorithm and an adaptive Kalman filtering algorithm are proposed for improving the crosstalk cancellation performance in vehicle audio systems. The performance comparison and analysis of the proposed algorithms and traditional LMS error algorithm are also described.

Key words : Acoustic crosstalk cancellation; Adaptive filter; Vehicle audio system