ON THE COMPLEXITY-PERFORMANCE TRADEOFF OF TWO ACTIVE NOISE CONTROL SYSTEMS FOR VEHICLES

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ABSTRACT

The aim of this paper is to show the experimental results achieved in the attenuation of periodic disturbances inside a vehicle with two Active Noise Control algorithms implemented on the TMS320C6701 DSP and to compare the computational complexity of both strategies:
(1) Modified FxGAL: Modified filtered-x gradient adaptive lattice algorithm. This technique is based on the signal orthogonalization carried out by an adaptive lattice predictor in a previous stage.
(2) Gμ-FxSLMS: Filtered-x sequential least mean square algorithm with step-size gain. This strategy is based on partial updates of the weights of an adaptive filter as well as on the controlled increase in step-size of the algorithm.
This work illustrates by means of two different algorithms the tradeoff established among computational costs, convergence rate, stability and mean-square error excess when DSP-based strategies are used in control systems focused on the attenuation of acoustic disturbances.