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Abstract

AN INVESTIGATION ON SUBBAND TECHNIQUE IN ACTIVE NOISE
CONTROL SYSTEM

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As the problem of controlling the noise in the environment has been the focal point of research over the years, and active noise control (ANC) is the one such approach that has been proposed for reduction of noise. ANC uses an electro-mechanical or electro-acoustic technique to create a quieter environment. The main idea of the ANC system is by providing a canceling “anti-noise wave” which has the same amplitude but the exactly opposite phase to cancel out the noise signal. The key point to achieve a perfect “anti-noise wave” is the process to generate secondary source. As a perfect process, it should be fast reverse the phase and keep the amplitude as beginning. There are some structures to improve the performance of the process and the subband structure is the one of them (subband means there are some sub bands in the main band). This thesis further discusses the effect of the subband structure in the ANC system. There are two kinds of subband structure: post-subband structure and pre-subband structure, in the post-subband structure, the subband structure is implemented in the error signal channel; while, in the pre-subband structure, the subband structure is implemented in the input signal channel. Both of them are briefly investigated in this thesis. Their results are different for different structures and also compared with no-subband structure performance: In the pre-subband structure, the ANC system with two subbands is converging faster than without subband; in the post-subband structure, the converging speed of the ANC system without subband is similar to the two subbands ANC system. This thesis also proposes the three subbands structure. The ANC system with three subbands is converging faster than the system with two subbands in the pre-subband system, while in the post-subband system, their

performances are similar. So that, this thesis tells us the subband structure can improve the converging speed in the pro-subband structure, and if there are more subbands, the converging speed is faster; while in the post-subband structure, the effect of the subband structure is very scant.