Active noise control for global area using sound rendering

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ABSTRACT

Noise in enclosed space like living or working environment causes stress and disturbs work and rest. Noise control over the whole area is needed in enclosed space because people keep moving. Active noise control(ANC) is a method to control the noise by superpositioning the noise and the opposite phase sound. Almost control region of ANC is limited around point like microphone. In this paper, we will introduce ANC method for global area. The basic concept is to measure the sound field of a noise source and radiates a sound field of the opposite phase using the control speakers. There are spatial aliasing issues by placement of microphones and speakers and it affects controllable and measurable radiation pattern and frequency range of interest. So, we proposed speakers and microphones modeling method considering spatial aliasing issues. To get opposite phase of noise source's sound field, we set sound power as a cost function. Wiener filter solution was used to get filter that minimizes the objective function. To verify our method, simulations and experiment is implemented. We used speaker as a noise source in experiment. We can get overall 11dB reduction on the spherical surface surrounding the noise source.