

The Directional Energy Decay Curve in Performance Spaces

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ABSTRACT

The analysis of the spatial features of sound fields is of great interest in room acoustic applications ranging from the analysis of concert venues to reverberation room design and calibration. The fundamental definition of the diffuse sound field is that it is isotropic – requiring the sound field to be composed of infinitely many sound waves from uncorrelated sources with directions of arrival uniformly distributed over a sphere. In previous work, we proposed the directional energy decay curve for the analysis of the sound field isotropy in a reverberation room. In this work, we present a similar study for performance spaces. Based on simulated energy decay curves, we analyze the directional condition in a complex room during the decay process of the sound field, thus gaining insight into the directional reverberation process for impulsive or switch-off excitation conditions. The results may be used for extension of the perception of envelopment or new metrics describing directional reverberance.

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