

A parametric hybrid room acoustic prediction method: development of an image-sources/diffusion equation approach for the high-frequency range

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ABSTRACT

Room acoustic prediction methods can generally be divided in to two main approaches, geometrical acoustic methods and wave-based methods. When a room auralization is to be performed in real time, as in virtual reality applications, computation time of the room acoustic prediction method becomes a key factor, even to the extent that an almost instantaneous computation of the impulse response is required. Because of this requirement a prediction method that renders a sufficiently realistic acoustic scenario in an as efficiently as possible way is desired. This research explores the possibility of combining three different acoustic modelling approaches into one parametric hybrid room acoustic model aimed at minimizing computation time while maintaining the desired realism. Parametric in this case refers to automated processes within the software to adjust model settings according the specific room acoustic scenario. The three combined approaches are the image source method and the diffusion equation method used for the high frequency range, and the wave-based Discontinuous Galerkin time-domain method for the low frequency range. The first part of this research focuses on combining the diffusion equation method with the image source method for the high frequency range.

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