LINDEMANN'S BINAURAL MODEL WITH CONTRALATERAL INHIBITION: INTERAURAL COHERENCE AND APPLICATIONS IN ROOM ACOUSTICS

By

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ABSTRACT

Computational models of the auditory system have been used to investigate human perception of sound since the late 1940s. Traditionally, these binaural models extracted information about location and intensity of sound through a relatively simple cross-correlation procedure. This paradigm was extended by Lindemann in 1986 with the introduction of a contralateral inhibition process, which applies a time- and intensity-dependent weighting to a pair of binaural signals and accurately reproduces psychoacoustical data where the traditional model fails, such as in the case of the precedence effect. Binaural noise stimuli with varying levels of coherence will be presented to a binaural model with contralateral inhibition, recreating a subjective experiment carried out by Blauert and Lindemann. The model results will then be analyzed to determine the spatial mapping of resulting intracranial auditory events and observe how they broaden and split depending upon the level of coherence. Model parameters will be adjusted to reproduce the psychoacoustic data and provide further validation of Lindemann's model. Finally, further applications of this model in room acoustics will be discussed and some preliminary work outlined.