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Loudness perception and modeling of impulsive sounds

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There are different loudness calculation procedures allowing for the prediction of the perceived loudness of time-varying sounds in many cases, such as the German standard DIN 45631/A1 and the proposed international standard ISO 532-1 as well as the Dynamic Loudness Model (DLM) (by Chalupper and Fastl), the Time Varying Loudness (TVL) model (by Glasberg and Moore) and the loudness calculation algorithm based on a hearing model of Sottek. However, recent studies show that the predictions for some impulsive sounds do not match the ratings of normal-hearing subjects. Therefore, the influence of specific signal properties of the sounds on the assessment of loudness was examined focusing on the impulsiveness of the sounds. For methodological validation in terms of loudness perception, experiments with different evaluation methods were performed. On the basis of these experiments, it was studied to what extent the loudness model based on the hearing model of Sottek must be adjusted to take into account the specific signal properties of impulsive sounds.

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