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Paper Title Improvements of calculating loudness of time-variant sounds

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Abstract Recently, a new ISO standard for loudness of arbitrary sounds was proposed for the revision of ISO 532:1975 section 2 (method B). It is based on DIN 45631/A1:2010, which includes the widely used standard DIN 45631:1991 for stationary sounds as a special case. The new proposal eliminates uncertainties of existing standards by strictly defining the complete procedure of loudness calculation starting with the waveform of the time signal and ending with specific and total loudness vs. time functions. The strict definition of the complete procedure is a step forward to comparability of calculated loudness results, and fully conforms to DIN 45631/A1:2010 for the sake of continuity. However, although the results of this algorithm are in accordance with the results of many listening tests, there are still phenomena that are not covered by this method. For example, the calculated loudness of sweep signals shows fluctuations, whereas the perceived loudness does not. This is due to the implemented filter bank based on fixed, contiguous third-octave filters. As a possible solution a loudness calculation method is presented, which is based on a hearing model (Sottek) using an appropriate auditory filter bank of highly-overlapped asymmetric filters. In addition, the nonlinearity between specific loudness and sound pressure has been reconsidered in this model according to results of many listening tests.

Theme T7 Loudness and other psycho-acoustical parameters