

Psychoacoustic Roughness Standard

Roughness of acoustic signals has been a focus of sound design for many years. A rough sound can contribute to a sporty character of an engine, but also to a strong annoyance. It is desired that a sound fits the product. This goal should be achievable as early as possible in the development process. For this purpose, perceptual evaluations in combination with model calculations and simulation tools must be used. Existing roughness calculation models work well for synthetic signals such as modulated tones and noise signals. However, the roughness prediction is much more challenging for technical sounds because of the more complex spectral and temporal patterns.

Although the consideration of roughness is very common in practice, there is still no standardized roughness calculation method. This paper describes a method that is based on a model of human hearing according to Sottek. It has been optimized for non-linear processing and the weighting of the modulation spectra. Additionally, a proposal for calculating a binaural single value of roughness is given. This model allows to predict the perceived roughness very well. The standardization of this roughness calculation method is planned both as a German standard (DIN) and as part of ECMA-74.

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