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Title: Progress in Roughness Calculation

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Abstract:

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 their more complex spectral and temporal patterns.

This paper describes the latest progress in roughness calculation. The algorithm for roughness calculation 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. The method was developed using several different types of synthetic as well as technical sounds.