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Title:

Modeling the perceived tonal loudness of multiple tonal components

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Abstract:

Tonal signals play an important role in many acoustic applications, such as electric vehicles, IT equipment, music, and home appliances. Psychoacoustic metrics such as tonality, described in the ECMA 418-2 standard, are used to adequately evaluate these sounds. This algorithm is based on the Sottek Hearing Model which is particularly well suited for cases where there is a single dominant tonal component. However, some sounds may have various tonal components such as harmonic/inharmonic complexes that may evoke different tonality perceptions.

To investigate the possible effect on tonal loudness of complex sounds, we conducted listening tests to determine a.) whether there is a difference between harmonic and inharmonic stimuli in terms of their loudness and b.) how the tonal loudness of a tonal complex changes by varying its individual components. We used the results to improve the modeling of the tonality algorithm described in ECMA 418-2.

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