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Tonalness perception of harmonic complex tones

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Many everyday sounds have a more or less tonal characteristic. This normally means they have some peaks in the spectrum and generate one or more of the pitch sensations. In this work we present the results of a listening test which deals with the perception of tonalness of harmonic complex sounds. It consisted in presenting sounds via headphones to the 30 listeners who had to evaluate the tonalness using magnitude estimation with a reference sound. The sounds presented to the listeners varied in some parameters which modified the perception of tonalness. The parameters are: i) tone to noise level (3dB steps), ii) number of harmonics (1, 2, 4, 8 and 8 with f0 and f1 removed) and iii) spectral shape of the harmonics (constant, -5dB/oct and 5dB/oct). The loudness of the stimuli were equalized.
Tonalness increases for higher tone to noise ratio. A change in the spectral shape is most important for a high number of harmonics. More harmonics also increase tonalness mostly for constant and increasing spectral shape.
The results of the test were also compared with the tonalness calculation algorithm from Aures' and the german DIN45681 model. Both gave a correlation coefficient > 0.95.