Objective assessment of spatial localisation attributes of surround-sound reproduction systems

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Abstract
A mathematical model for objective assessment of perceived spatial quality was developed for comparison across the listening area of various sound reproduction systems: mono, two-channel stereo (TCS), 3/2 stereo (5.0 surround sound), Wave Field Synthesis (WFS) and Higher Order Ambisonics (HOA). Models for mono, TCS and 3/2 stereo are based on conventional microphone techniques and loudspeaker configurations for each system. WFS and HOA models use circular arrays of thirty-two loudspeakers, driven by signals derived from a virtual microphone array and the Fourier-Bessel spatial decomposition of the sound field respectively. Directional localisation, ensemble width and ensemble envelopment of tones, extracted from binaural signals, are analysed under a range of test conditions.

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