Sound-field reconstruction performance of a mixed-order Ambisonics microphone array - DTU Orbit (25/12/2018)

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Recently, there has been increasing interest in using spherical microphone arrays for spatial audio recordings. Accurate recordings are important for a range of applications, from virtual sound environments for hearing research through to the evaluation of communication devices, such as hearing instruments and mobile phones. Previously, a mixed-order Ambisonics (MOA) approach was proposed to improve the horizontal spatial resolution of spherical arrays. This was achieved by increasing the number of microphones near the horizontal plane while keeping the total number of transducers fixed. The approach is motivated by the fact that human spatial hearing is most acute in the horizontal plane. This study presents simulations of the performance of an MOA rigid-sphere microphone array, and its robustness to variations in microphone characteristics. Specifications of a commercially available microphone were used to simulate self-noise, sensitivity, and phase response variations between the microphones. To quantify the reconstruction error and the "sweet area" as a function of source elevation, the reconstructed sound field based on a simulated array measurement was compared to the reference sound field for both horizontal and elevated sources. It is expected that the MOA approach results in a larger sweet area for mid to high frequencies for horizontal sources.

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