PROCEEDINGS of the
23rd International Congress on Acoustics
9 to 13 September 2019 in Aachen, Germany

A high order rigid spherical microphone array design using MEMS microphones

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Abstract

In recent years spherical microphone arrays have gained much prominence in the field of room acoustics. They provide a powerful framework for the analysis of the directional properties of sound fields in rooms. However, their angular resolution is limited by the number of microphones in the array, resulting in a poor performance for low order arrays when used in highly reverberant sound fields found in reverberation rooms. However, higher order microphone arrays require a large quantity of microphones potentially rendering the design economically unfeasible.

We present a high order spherical microphone array design using consumer grade MEMS microphones combined with an equalization kernel implemented on an FPGA. A performance analysis of the prototype regarding the usable frequency range and the achievable angular resolution with special regard to the analysis of sound fields in reverberation rooms is given.

Keywords: Spherical arrays, microphones