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## IDENTIFICATION OF BOUNDARY CONDITIONS IN ARBITRARILY SHAPED CAVITIES

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### ABSTRACT

Knowledge about damping and elasticity of walls enclosing any kind of spaces is highly significant for determination, prediction and optimization of acoustical behavior. These properties may be quantified in terms of the acoustical boundary impedance or boundary admittance, respectively. Herein, the authors consider identification of the complex boundary admittance values of a closed cavity. We assume that inside the cavity the sound pressure is described by the Helmholtz equation. Common solution of the forward problem, i.e. evaluation of the sound pressure in terms of structural vibrations of the surrounding wall and the boundary admittance, utilizes numerical solution methods such as FEM and BEM. While BEM features the advantage of requiring a meshing of the boundary only, FEM is chosen for the sake of sparse matrices and its potential to easily produce modal information. In this contribution, BEM-based and FEM-based inverse approaches are described and compared. Inverse approaches are understood such that the sound pressure is available from measurements whereas the boundary admittance will be determined. The algorithms of inverse FEM and inverse BEM will be discussed with respect to accuracy and efficiency, particularly considering their application to solution of frequency range problems. Results will be shown for two-dimensional examples.