

## **FEM/Wideband FMBEM acoustic sensitivity analysis for thin structures**

**L.L. Chen, \*H.B. Chen, and C.J. Zheng**

Department of Modern Mechanics, University of Science and Technology of China, Hefei, Anhui 230027, P.R.China.

\*Corresponding author: hbchen@ustc.edu.cn

The analysis of the acoustic radiation or scattering from elastic structure in heavy fluid is a classical problem in acoustics. FEM has been widely used to analyze the dynamic behavior of structures, while BEM has some advantages in solving infinite acoustic problems. So, a suitable approach for fluid-structure interaction problems and the associated predictions is the coupled FEM/BEM. In this paper, The solution of the BEM system of equations in the coupling FEM/BEM is accelerate by a wideband fast multipole method, and the proposed FEM/Wideband FMBEM is further developed for the acoustic design sensitivity analysis of the fluid structure system. The examples of scattering from elastic infinity cylinder and sphere shell underwater are presented to demonstrate the accuracy and efficiency of this method.

**Keywords:** Boundary element method, Finite element method, Fluid-structure interaction, Wideband fast multipole method, Acoustic sensitivity analysis