

Boundary Elements with Mesh Refinements for the Wave Equation

Ernst P. Stephan
Leibniz Universität Hannover

Time domain Galerkin boundary elements provide an efficient tool for the numerical solution of boundary value problems for the homogeneous wave equation. We review recent advances in time domain boundary elements with mesh refinements for 3D problems. We present an a priori error analysis for graded meshes to resolve geometric edge and corner singularities.

On the other hand, an a posteriori error analysis gives rise to adaptive mesh refinement procedures based on error indicators of residual type. Applications include nonlinear dynamic contact problems and engineering problems in the sound emission of car tires. Numerical experiments underline our theoretical results.