OCTREE-BASED FINITE ELEMENT METHOD FOR LARGE-SCALE EARTHQUAKE GROUND MOTION MODELING IN HETEROGENEOUS BASINS

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This work reports on the development of a parallel numerical octree-based finite element methodology for simulating earthquake-induced ground motion in large, highly heterogeneous basins. We use an out-of-core octree-based mesh generator developed by Tu and O'Hallaron (2002), which allows us to generate meshes of essentially arbitrary resolution, and an efficient portable mesh solver to model the elastic wave propagation problem on distributed memory parallel supercomputers. We report on parallel performance on the Cray T3E and the TCS at the Pittsburgh Supercomputing Center. The results indicate that, despite the highly irregular structure of the problem, excellent performance and scalability are achieved.