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Yongning Zhu* (yzhu@math.ucla.edu), University of California Los Angeles. *An efficient multigrid method for the simulation of high resolution elastic solids.*

We present a multigrid framework for the simulation of high resolution elastic deformable models, designed to facilitate scalability on shared memory multiprocessors. We incorporate several state-of-the-art techniques from multigrid theory, while adapting them to the specific requirements of graphics and animation applications, such as the ability to handle elaborate geometry and complex boundary conditions. Our method supports simulation of linear elasticity and co-rotational linear elasticity. The efficiency of our solver is practically independent of material parameters, even for near-incompressible materials. We achieve simulation rates as high as 6 frames per second for test models with 256K vertices on an 8-core SMP, and 1.6 frames per second for a 2M vertex object on a 16-core SMP. (Received August 18, 2010)