Meshless Compressible Flow Simulations on Graphical Processor Units (GPUs) JOHN THOMAS, JACOB ALLDREDGE, Johns Hopkins University — A computationally efficient framework for performing compressible flow simulations over rigid solids is presented. This framework, which is based on a lattice-Boltzmann model, incorporates a volume fraction-based voxelation algorithm to eliminate the explicit meshing process. Moreover, as a framework tuned to run on graphical processers units (GPUs), simulations involving tens-of-billions of grid points can be run on hobby-sized computers in about one day. We validate predictions from this framework using experimental data for flow past wedges, spheres, and airfoils at a variety of Mach numbers.

John Thomas
Johns Hopkins University

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