

Abstract Submitted
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Multi-physics/scale simulations using particles
PETROS KOUMOUTSAKOS, ETH Zurich — Particle simulations of continuum and discrete phenomena can be formulated by following the motion of interacting particles that carry the physical properties of the systems that is being approximated (continuum) or modeled (discrete) by the particles. We identify the common computational characteristics of particle methods and emphasize their key properties that enable the formulation of a novel, systematic framework for multiscale simulations, that can be applicable to the simulation of diverse physical problems. We present novel multiresolution particle methods for continuum (fluid/solid) simulations, using adaptive mesh refinement and wavelets, by relaxing the grid-free character of particle methods and discuss the coupling of scales in continuum-atomistic flow simulations.

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