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A Dual Particle Computational Method for Continua

L.D. Libersky[(1)], P.W. Randles[(2)]

(1) *Los ALamos National Laboratory, Los Alamos, New Mexico*
(2) *Defense Threat Reduction Agency, Kirtland AFB, New Mexico*

A brief history of particle methods will be presented towards assessing the promise offered by these techniques for computational continuum dynamics. We will then discuss recent progress in Dual Particle Dynamics (DPD), a spatially staggered particle discretization of the strong form. Particular attention will be given to stability, boundary conditions, and neighbor searching. We demonstrate stability for Eulerian kernels resulting from the coupling of linear completeness in spatial derivative estimates and two-step Predictor–Corrector time derivative approximations. Boundary conditions are formulated in a unified and consistent way using constrained MLS fits. Several test problems are shown and conclusions drawn.

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