

Abstract Submitted  
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**New Formulation of Artificial Viscosity for Lagrangian Analysis of Shocks**<sup>1</sup> HAIBING ZHOU, JUN XIONG, SHUDAO ZHANG, Institute of Applied Physics and Computational Mathematics, Beijing, China — We have developed a new artificial viscosity that satisfies a set of conditions set out by Caramana.<sup>2</sup> This is based on Lews<sup>3</sup> artificial viscosity. Due to the tensor nature of the new artificial viscosity, it reduces the dependence of the numerical solution on the grid. Central to this formulation is an eigenvalue viscosity limiter to control the magnitude of the artificial viscosity. This is effected in a simple and straightforward manner to obtain forms of artificial viscosity that are able to distinguish between adiabatic and shock compression. The formulation is applicable to any number of dimensions and for grids that are either logically rectangular or unstructured. The viscous stress is simply computed with respect to a given element of grid that always yields the compression condition and with limiter functions computed with respect to neighbor element.

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<sup>2</sup>E. J. Caramana, M. J. Shashkov and P. P. Whalen, *J. Comp. Physics*, 144, 70-97, 1998.

<sup>3</sup>A. Lew, R. Radovitzky and M. Ortiz, *J. Computer-Aided Materials Design*, 8, 213-231, 2001.

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