Petascale FDF Large Eddy Simulation of Reacting Flows

PATRICK PISCIUNERI, Mechanical Engineering and Materials Science, University of Pittsburgh, S. LEVENT YILMAZ, Center for Simulation and Modeling, University of Pittsburgh, PEYMAN GIVI, Mechanical Engineering and Materials Science, University of Pittsburgh — A novel computational methodology, termed "Irregularly Portioned Lagrangian Monte Carlo-Finite Difference" (IPLMCFD) is developed for large eddy simulation (LES) of turbulent flows. This methodology is intended for use in the filtered density function (FDF) formulation and is particularly suitable for simulation of chemically reacting flows on massively parallel platforms. The IPLMCFD allows for tremendous improvements in scalability, and is the key enabler of petascale computations. The methodology is employed for LES of several flame configurations.

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