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Data-driven optimization strategies for staggered-grid Lagrangian methods JASON ALBRIGHT, MIKHAIL SHASHKOV, NATHAN URBAN, Los Alamos National Laboratory — For applications dealing with shock waves, algorithmic ingredients like artificial viscosity are essential to avoid highly oscillatory solutions. Yet they also introduce additional model parameters that are usually poorly constrained and consequently are often hand-tuned to problem specific applications. In this talk, we produce optimal values for parameters controlling the amount of artificial viscosity and artificial heat flux through a combination of large ensemble sampling and machine learning-based optimization techniques. We illustrate that the optimal parameter set significantly improves the accuracy, efficiency, and flexibility of the underlying scheme. Although, we illustrate this strategy for a particular discretization scheme, this methodology may be generalized to a much wider variety of existing methods.

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