

AN ADAPTIVE AND QUASI-CONSERVATIVE SEMI-LAGRANGIAN ADVECTION-DIFFUSION ALGORITHM

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ABSTRACT

The combination of advection dominated flows with physically or chemically induced diffusion of a constituent often poses problems to numerical schemes with respect of stability and accuracy. In this presentation we explore the efficacy of combining adaptive mesh refinement for local accuracy, semi-Lagrangian time discretization for stability, a flux-based formulation and discretization for (quasi) conservative numerical properties, and an advection-diffusion split form for solving the corresponding problem. The resulting algorithm is simple and efficient. Several tests are conducted to demonstrate its properties.

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