

Mathematical Sciences Colloquium

Michigan Technological University

Fisher Hall 127

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1:05 p.m.

A high order finite difference method with subcell resolution for stiff multispecies detonation in under-resolved mesh.

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ABSTRACT: In this talk, we propose a high order finite difference WENO method with Harten's ENO subcell resolution idea for the chemical reactive flows. In the reaction problems, when the reaction time scale is very small, the problems will become very stiff. Wrong propagation of discontinuity occurs due to the underresolved numerical solutions in both the space and time. The proposed method is a modified fractional step method which solves the convection step and reaction step separately. A fifth-order WENO is used in convection step. In the reaction step, a modified ODE solver is applied but with the flow variables in the discontinuity region modified by the subcell resolution idea.