Seminario de Análisis Numérico y Modelación Matemática

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High-resolution schemes with polynomial viscosity matrices for multi-species kinematic flow models

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Resumen

In this work, we present a class of fast first order finite volume solvers, called PVM (polynomial viscosity matrix), for conservative hyperbolic systems. They are defined in terms of viscosity matrices computed by a suitable polynomial evaluation of a Roe matrix. These methods have the advantage that they only need some information about the eigenvalues of the system to be defined, and no spectral decomposition of a Roe matrix is needed. As a consequence, they are faster than the Roe method. On the other hand, because we propose to use a first order finite volume solvers, we analyze the use of high-order reconstruction method WENO and MUSCL, each of these used for the reconstruction of flows and states respectively, for obtain as result a high-resolution schemes with polynomial viscosity matrices economic in the sense of PVM methods. The numerical tests presented here, the performances of the numerical schemes and compared with each others is performed for multi-species kinematic flow models.