UNIVERSIDAD TECNICA FEDERICO SANTA MARIA

DEPARTAMENTO DE MATEMÁTICA

Próximo Seminario DMAT

Jueves 6 de Mayo de 2021, 12:15 - 13:15

MODALIDAD VIRTUAL VIA ZOOM
ID: 829 7531 7816
CÓDIGO: 014211

GINO MONTECINOS

(UNIVERSIDAD DE AYSÉN)

Simplified Cauchy-Kowalewskaya procedure for building ADER finite volume schemes for hyperbolic balance laws

The Cauchy-Kowalewskaya (CK) procedure is a key building block in the design of solvers for the Generalised Riemann Problem (GRP) based on Taylor series expansions in time. The CK procedure allows us to express time derivatives in terms of purely space derivatives. This is a very cumbersome procedure, which often requires the use of software manipulators. In this paper, a simplification of the CK procedure is proposed in the context of implicit Taylor series expansion for GRP, for hyperbolic balance laws in the framework of [Journal of Computational Physics 303 (2015) 146-172]. A recursive formula for the CK procedure, which is straightforwardly implemented in computational codes, is obtained. The proposed GRP solver is used in the context of the ADER approach and several one-dimensional problems are solved to demonstrate the applicability and efficiency of the present scheme. An enhancement in terms of efficiency, is obtained. Furthermore, the expected theoretical orders of accuracy are achieved, conciliating accuracy and stability.