“Mapped Tent Pitching Schemes for Hyperbolic Systems”

Christoph Wintersteiger  TU Wien, Wiedner Hauptstr. 8-10, 1040 Wien

Abstract

Tent pitching algorithms construct space-time meshes by vertically erecting canopies over vertex patches. The main advantage is the ability to advance in time by different amounts at different spatial locations. These tent pitched meshes are usually combined with a space-time discretization, which leads to a rather large local problem on each tent. This talk considers a novel discretization technique, that exploits the structure of tent pitched meshes to reduce the local problem size. The reduction is obtained by transforming the tents to a reference domain with a space-time tensor product structure, which then allows to discretize space and time independently. These Mapped Tent Pitching (MTP) schemes can be applied to both, linear and non-linear systems. A fully implicit MTP scheme for linear systems is presented in [1] and this talk will focus explicit MTP schemes for linear and non-linear systems (see [1, 2]). Numerical results for the Euler equations in 2+1 dimensions and the linear wave equation in 3+1 dimensions will be shown.

References