数学与系统科学研究院

计算数学所学术报告

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报告题目：

Runge Kutta Discontinuous Galerkin Method for the Numerical Solution of Shallow Granular Avalanche

邀请人：　袁礼 研究员

报告时间：2018 年 12 月 24 日（周一）

下午 15:00-16:00

报告地点：　　数学院南楼九层

902 教室

Abstract:

I will review the applicability of the Runge-Kutta Discontinuous Galerkin (DG) method for the numerical solution of the Savage Hutter equations that describe the motion of granular material under the influence of gravity and friction. The governing equations consist of a hyperbolic system of coupled nonlinear partial differential equations for the temporal evolution of the depth and depth-averaged velocity tangential to the basal surface, which can predict the locations and shape of the deposition heaps on terrains. The model involves two phenomenological parameters, the internal and the bed friction angles, which together define the earth pressure coefficient of two values depending upon whether the flow is either diverging or contracting. Because of the hyperbolic nature of these equations, the velocities may become supercritical and shock waves are often formed. Numerical schemes for solving such equations must have the ability to cope with smooth as well as nonsmooth situations. One of the key ingredients of DG methods is the formulation of interface numerical flux, which provides a weak coupling between the unknowns in the neighboring elements. This scheme combines the properties of the finite element and finite-volume techniques resulting in its main advantages such as mass and momentum conservation, the handling of complex geometries with high order accuracy and compactness. Numerical results for the 1D flow of granular material along an inclined plane and the deposited heap on a horizontal plane is illustrated to show the performance of the proposed method.

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