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THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON SCIENTIFIC COMPUTATION

Local discontinuous Galerkin methods for diffusive-viscous wave equations

by

Dr. Dan LING

Xi'an Jiaotong University

Abstract

Numerical simulation of seismic wave equations has attracted much attention and plays a significant role in exploration seismology. As one of seismic wave models, the diffusive-viscous wave theory usually describes the attenuation of seismic wave propagating in fluid-saturated medium. In this talk, we focus on the design of numerical methods for the diffusive-viscous wave equations with variable coe icients:

$$\frac{\partial u}{\partial t^2} + \alpha(\boldsymbol{x})\frac{\partial u}{\partial t} - \frac{\partial u}{\partial t}\mathrm{div}(\beta^2(\boldsymbol{x})\nabla u) - \mathrm{div}(\gamma^2(\boldsymbol{x})\nabla u) = f.$$

We develop a local discontinuous Galerkin (LDG) method, in which numerical fluxes are chosen carefully to maintain stability and accuracy. Moreover, we also prove the optimal error estimates for both the energy norm and the L^2 norm. Numerical experiments are provided to demonstrate the optimal convergence rate and effectiveness of the proposed LDG method. This is a joint work among others with Prof. Chi-Wang Shu.

Date : 22 January 2024 (Monday)
Time : 11:00am
Venue : Room 4472 (Lifts 25/26)

All are Welcome!