数学与系统科学研究院

计算数学所系列学术报告

报告人：Prof. Jingfang Huang

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报告题目：

A Short Course on the Hierarchical Modeling Technique

邀请人： 卢本卓 研究员

报告时间：

2018年7月12日（周四）下午14:00-17:00
2018年7月13日（周五）下午14:00-17:00

报告地点： 科技综合楼三层

311 报告厅

Abstract:

The hierarchical modeling technique is defined as the following steps to study a given system or dataset. It first identifies any low-rank, or low-dimensional, or other compact features using appropriate and mathematically rigorous definitions. The compressed representations are then recursively collected from children to parents, and transmitted between different nodes on a hierarchical tree structure using properly compressed translation operators. In its numerical design and implementation, the hierarchical models are often expressed as recursive algorithms, which can be either interfaced with existing dynamical scheduling tools directly, or effectively flattened for improved parallel efficiency using techniques from the HPC community.

In this short course, we will study the fundamentals of the hierarchical modeling technique, including the low-rank and low-dimensional properties, hierarchical tree structure, "local" translations between tree nodes, and recursive algorithm design principles. Several case studies will be covered, including the fast multipole method, fast orthogonal matrix generation and matrix-vector multiplications, and convolutions of the layered media Green's functions with given density functions.

This course will be accessible to first year graduate students. Students are expected to know the basic linear algebra and calculus concepts from their undergraduate studies.

欢迎大家参加！