

数学与系统科学研究院  
计算数学所网络学术报告

报告人: **Dr. Kaibo Hu**

( *University of Minnesota* )

报告题目:

**A cohomological perspective for  
some high order problems (I)**

邀请人: 张硕 副研究员

报告时间: 2020 年 12 月 1 日 (周二)

上午 10:00-11:00

报告工具: 腾讯会议 (ID: 179 438 467)

会议链接:

<https://meeting.tencent.com/s/UjXj4lDpRDJk>

## **Abstract:**

High order differential operators occur in a wide range of problems, including thin structures, continuum mechanics incorporating rotational degrees of freedom (Cosserat type models), and generalized models in electromagnetism etc. In this presentation, we provide a cohomological perspective for the analysis and numerics of these problems from two slightly different angles.

In Part 1 of the presentation, we connect high order operators to fluid mechanics and de Rham complexes with higher regularity. We construct a finite element complex on tetrahedral meshes, consisting of a conforming discretization for the gradcurl (quad-curl) problem with 18 dofs (degrees of freedom) and a stable and mass-preserving finite element pair for solving the Navier-Stokes equations. The latter provides a simple stabilization for the classical Scott-Vogelius elements, and in the lowest order case has 16 dofs for the velocity and 1 dof for the pressure, respectively.

**欢迎大家参加！**