

数学与系统科学研究院  
计算数学所网络学术报告

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报告题目:

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

邀请人: 张硕 副研究员

报告时间: 2020 年 12 月 2 日 (周三)

上午 10:00-11:00

报告工具: 腾讯会议 (ID: 506 921 489)

会议链接:

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

## **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 2, we fit high order operators in new complexes derived from an algebraic machinery. Hodge (Helmholtz) decompositions play a vital role in fluid and electromagnetic applications. Here we establish analogous decompositions with high order operators. In contrast to classical situations such as Stokes and Maxwell, the high order nature of the operators yields nontrivial harmonic forms ("rigid body motions") even on domains with trivial topology. As a computational consequence, the harmonic forms lead to pseudo-solutions with standard high order scalar finite elements. The algebraic machinery also serves as a constructive tool to derive new finite elements

**欢迎大家参加！**