



复旦大学数学科学学院 数学综合报告会

报告题目: MINIMAL DEGREE $H(\text{curl})$ AND $H(\text{div})$ CONFORMING
FINITE ELEMENTS ON POLYTOPAL MESHES

报告人: 汪艳秋 教授 (南京师范大学)

时间: 2018-07-31 星期二 9:00-11:00

地点: 光华东主楼 1801

摘要: We construct $H(\text{curl})$ and $H(\text{div})$ conforming finite elements on convex polygons and polyhedra with minimal possible degrees of freedom, i.e., the number of degrees of freedom is equal to the number of edges or faces of the polygon/polyhedron. The construction is based on generalized barycentric coordinates and the Whitney forms. In 3D, it currently requires the faces of the polyhedron be either triangles or parallelograms. Formulas for computing basis functions are given. The finite elements satisfy discrete de Rham sequences in analogy to the well-known ones on simplices. Moreover, they reproduce existing $H(\text{curl})$ - $H(\text{div})$ elements on simplices, parallelograms, parallelepipeds, pyramids and triangular prisms. The approximation property of the constructed elements is also analyzed by showing that the lowest-order simplicial Nédélec-Raviart-Thomas elements are subsets of the constructed elements on arbitrary polygons and certain polyhedra.

非线性数学模型与方法教育部重点实验室
中法应用数学国际联合实验室
上海市现代应用数学重点实验室
复旦大学数学研究所