数学与系统科学研究院

计算数学所学术报告

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报告题目：

How a nonconvergent recovered Hessian works in mesh adaptation

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报告地点： 科技综合楼三层 **311**

计算数学所报告厅

Abstract：

Hessian recovery has been commonly used in mesh adaptation for obtaining the required magnitude and direction information of the solution error. Unfortunately, a recovered Hessian from a linear finite element approximation is nonconvergent in general as the mesh is refined. It has been observed numerically that adaptive meshes based on such a nonconvergent recovered Hessian can nevertheless lead to an optimal error in the finite element approximation. This also explains why Hessian recovery is still widely used despite its nonconvergence. In this talk I will present an error bound for the linear finite element solution of a general boundary value problem. The bound is valid under a mild assumption on the closeness of the recovered Hessian to the exact one. Numerical results show that this closeness assumption is satisfied by the recovered Hessian obtained with commonly used Hessian recovery methods. Moreover, it is shown that the finite element error changes gradually with the closeness of the recovered Hessian. This provides an explanation on how a nonconvergent recovered Hessian works in mesh adaptation.

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