



復旦大學
FUDAN UNIVERSITY

Applied Math
Ph.D. Seminar

Can We Compute both Upper and Lower Eigenvalue Bounds Using Only One FEM?

Speaker: Liuyao Yuan (Tongji University)

Time: 2023-11-23, 16:10 to 17:00

Location: Rm 1801, Guanghua East Tower

Advisor: Xuejun Xu (Tongji University)

Abstract: In this talk, we observe an interesting phenomenon for a hybridizable discontinuous Galerkin (HDG) method for eigenvalue problems. Specifically, using the same finite element method, we may achieve both upper and lower eigenvalue bounds simultaneously, simply by the fine tuning of the stabilization parameter. Based on this observation, a high accuracy algorithm for computing eigenvalues is designed to yield higher convergence rate at a lower computational cost. Meanwhile, we demonstrate that certain type of HDG methods can only provide upper bounds. As a by-product, the asymptotic upper bound property of the Brezzi-Douglas-Marini mixed finite element is also established. Numerical results supporting our theory are given. Extension to WG method will also be mentioned.