A Two-Grid Discretization Scheme For Non-selfadjoint Eigenvalue Problems

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This paper discusses high efficiency finite element discretization scheme for non-selfadjoint elliptic differential operator eigenvalue problems. It used Rayleigh quotient accelerate method to non-selfadjoint problems.

Defined a generalized Rayleigh quotient and on the foundation built a new two-grid discretization scheme. According to the indication of theoretical analysis and numerical experiments, with this scheme in this paper, first use finite element to solve an eigenvalue problem and a linear equation on a relatively coarse grid K^H, then solve l (l is ascent of finite element eigenvalue λ_H) linear equations which have the same coefficient matrix on the fine grid K^h, and finally compute the generalized Rayleigh quotient. The resulting solution still maintains the asymptotically optimal accuracy which used the finite element to solve eigenvalue prolem on the fine grid K^h directly. Compared to the exist schemes now, it is a high efficiency.

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