Some DD methods for Symmetric Eigenvalue Problems

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Location: Rm 1801, Guanghua East Tower

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Abstract: Domain decomposition (DD) methods are very popular for solving linear systems. Recently, some DD methods for eigenvalue problems are proposed. In this talk, we will revisit Newton-Schur (NS) method, an algebraic DD method for symmetric eigenvalue problems, and study it in Hilbert space. As a Newton method, we will present some sufficient conditions for the quadratic convergence of NS method. For symmetric elliptic eigenvalue problems discretized by the standard finite element method and non-overlapping DD method, we will show that the rate of convergence is

$$\epsilon_N \le C\epsilon^2,$$

where C is a constant independent of mesh sizes, ϵ_N and ϵ are errors of the approximated eigenvalue after and before one iteration, respectively. Furthermore, we will also introduce some first order iterative methods for symmetric elliptic eigenvalue problems based on DD methods. Estimations for the rate of convergence will also be covered.