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Fictitious component and domain decomposition methods for the solution of eigenvalue problems. (English) [Zbl 0677.65033](#)

Computing methods in applied sciences and engineering VII, Proc. 7th Int. Symp., Versailles/France 1985, 155-172 (1986).

Summary: [For the entire collection see [Zbl 0651.00020](#).]

The present paper deals with the application of fictitious component and domain decomposition methods for computing the minimal eigenvalue and the corresponding eigenvector of generalized algebraic eigenvalue problem with sparse matrices of special structure. Such matrices arise from discretization of differential eigenvalue problem with 3D Laplacian by finite element method with piecewise trilinear basis functions. Much attention is paid to the realization of the proposed methods in subspaces of much lesser dimension than that of the original algebraic problem.

MSC:

- [65F15](#) Numerical computation of eigenvalues and eigenvectors of matrices
- [65N25](#) Numerical methods for eigenvalue problems for boundary value problems involving PDEs
- [35P15](#) Estimates of eigenvalues in context of PDEs

Cited in **1** Document

Keywords:

fictitious component; domain decomposition; minimal eigenvalue; eigenvector; sparse matrices; differential eigenvalue problem; 3D Laplacian; finite element method; piecewise trilinear basis functions