LOWER BOUNDS FOR PRINCIPLE EIGENVALUES OF ELLIPTIC OPERATORS

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Abstract. We present a general numerical method for computing two-sided bounds for principal eigenvalues of symmetric linear elliptic differential operators. The approach is based on the Galerkin method, on the method of a priori-a posteriori inequalities, and on a complementarity technique. The two-sided bounds are formulated in a general Hilbert space setting. The abstract results are subsequently applied to Friedrichs', Poincaré, and trace inequalities and fully computable two-sided bounds on the optimal constants in these inequalities are obtained. Accuracy of the method is illustrated on numerical examples.

References

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