Computation of the minimum eigenvalue for a nonlinear Sturm-Liouville problem

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Abstract

© 2014, Pleiades Publishing, Ltd. A condition for the existence of a minimum eigenvalue corresponding to a positive eigenfunction of the nonlinear eigenvalue problem for an ordinary differential equation is determined. The problem is approximated by a mesh scheme of the finite element method. The convergence of approximate solutions to exact ones is studied. Theoretical results are illustrated by numerical experiments for a model problem.

Keywords

eigenvalue, finite element method, nonlinear eigenvalue problem, ordinary differential equation, positive eigenfunction, Sturm-Liouville problem