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Spectral approximation and asymptotic behavior of boundary layer problems. (English)
Zbl 0810.34048

A modification, by the introduction of an appropriate stretching variable, of the standard spectral approximation is constructed for a singularly perturbed second-order ordinary boundary value problem with \( C^2 \) coefficients. By the use of a resemblance function a division point is determined which separates the outside from the inside of the boundary layer. An estimate of the error is given and numerical results are mentioned.

Reviewer: M. Rodriguez Ricard (La Habana)

MSC:
34E15 Singular perturbations for ordinary differential equations
34B24 Sturm-Liouville theory
41A50 Best approximation, Chebyshev systems
65L10 Numerical solution of boundary value problems involving ordinary differential equations
34L05 General spectral theory of ordinary differential operators

Keywords:
stretching variable; spectral approximation; singularly perturbed second-order ordinary boundary value problem; boundary layer; numerical results