McCoid, Conor; Trummer, Manfred R.
Improved resolution of boundary layers for spectral collocation. (English) Zbl 1431.65225

The authors of this article consider singularly perturbed two-point boundary value problems in one dimension. They derive an algorithm based on the regularized sine-transformation with and without resampling in order to improve the accuracy of the spectral method. It is shown numerically that a better accuracy can be achieved when the regularization parameter is chosen from an optimal range.

Reviewer: Andreas Kleefeld (Jülich)

MSC:
65N35 Spectral, collocation and related methods for boundary value problems involving PDEs
65L10 Numerical solution of boundary value problems involving ordinary differential equations
35B25 Singular perturbations in context of PDEs

Keywords:
spectral methods; singular perturbation; boundary value problems; coordinate transformation; Chebyshev collocation; boundary layers

Full Text: DOI

References:

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