

Exponential Spline Solution for Singularly Perturbed Boundary Value Problems with an Uncertain-But-Bounded Parameter

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Abstract : In this paper, we consider singular perturbation reaction-diffusion boundary value problems, which contain a small uncertain perturbation parameter. To solve these problems, we propose a numerical method which is based on an exponential spline and Shishkin mesh discretization. While interval analysis principle is used to deal with the uncertain parameter, sensitivity analysis has been conducted using different methods. Numerical results are provided to show the applicability and efficiency of our method, which is ε -uniform convergence of almost second order.

Keywords : singular perturbation problem, shishkin mesh, two small parameters, exponential spline, interval analysis, sensitivity analysis

Conference Title : ICMCSE 2018 : International Conference on Mathematical, Computational Science and Engineering

Conference Location : Berlin, Germany

Conference Dates : May 21-22, 2018