FITTED-STABLE CENTRAL DIFFERENCE METHOD FOR SOLVING SINGULARLY PERTURBED DELAY DIFFERENTIAL EQUATIONS

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Abstract

Fitted-stable central difference method is presented for solving singularly perturbed delay differential equations with the boundary layer at one end (left or right) point. A second order singularly perturbed delay differential equation is replaced by an asymptotically equivalent singularly perturbed two point boundary value problem. A fitting factor is introduced in second-order stable central difference scheme and is obtained from the theory of singular perturbations. Thomas Algorithm is used to solve the system and its stability is investigated. To demonstrate the applicability of the method, we have solved several linear and non-linear problems. From the results, it is observed that the present method approximates the exact solution very well.

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