

A FITTED NUMEROV METHOD FOR SINGULARLY PERTURBED
REACTION-DIFFUSION EQUATIONS

Fevzi ERDOGAN¹, Kerem YAMAC², Mehmet Gıyas SAKAR³

^{1,2,3} *Yuzuncu Yil University, Van, Turkey*

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Abstract

In this paper we considered singularly perturbed reaction-diffusion problem whose solution exhibits boundary layers. We have introduced a simple and efficient computational technique based on Numerov's scheme which is composed of an exponentially fitted difference scheme on uniform mesh. A fitting factor is obtained from the theory of singular perturbations. The method is shown to uniformly convergent with respect to the perturbation parameter. A numerical experiment illustrate in practice the result of convergence proved theoretically.

Keywords: Singularly perturbation problems, Reaction-diffusion problem, Boundary layer, fitting factor, Numerov's method

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¹ferdogan@yyu.edu.tr

²keremyamac@yahoo.com

³giyassakar@hotmail.com