National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Numerical methods for singularly perturbed problems with mesh adaptation ensuring parameter uniformity
Speaker	: Ajaya Padhan (Rollno : 523ma2001)
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Venue	: MN-336, Seminar Room, MA dept
Date and Time	: 29 Apr 2025 (04.30 PM)
Abstract	: Robust adaptive grid-based moving mesh algorithms are discussed for singularly perturbed second-order convection-diffusion type Volterra integro differential equations. Two different kinds of monitor functions are used to establish the numerical schemes. A well-studied first-order monitor function is used to construct Scheme-I which is a combination of the upwind scheme and the left rectangle rule of first-order accuracy. Further, the use of a comparatively new second-order monitor function is examined to elevate the accuracy of Scheme-I via the Richardson extrapolation technique. The numerical experiments are extended to some nonlinear model problems of similar nature. All the theoretical claims are validated by performing several numerical experiments. The constructed adaptive meshes have proved to be beneficial over some existing graded meshes as they are not a priori. Also, they help the standard schemes to attain their optimal accuracy unlike the standard Shishkin-mesh.