

Special time integrators for 2D evolutionary singularly perturbed systems

C. Clavero¹, J.C. Jorge²,

SUMMARY

In this talk we introduce a new technique to develop efficient time integrators for solving a class of linear 2D parabolic singularly perturbed systems. We pay special attention to systems where small diffusion parameters with different orders of magnitude appear in the differential equations, provoking that their solutions have overlapping boundary layers. Our proposal combines the advantages of classical alternating direction methods and the more recent splitting by components technique. These time integration processes are combined with suitable finite difference methods on appropriate piecewise uniform meshes, of Shishkin type to discretize in space. We show some numerical results which confirm the predicted advantages of the numerical algorithm.

Keywords: singular perturbation, uniform convergence, splitting and alternating directions.

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²ISC & Departamento de Estadística, Informática y Matemáticas,
Universidad Pública de Navarra
email: jcjorge@unavarra.es

¹IUMA & Departamento de Matemática Aplicada,
Universidad de Zaragoza
email: clavero@unizar.es