STABILIZATION OF CONVECTION-DIFFUSION PROBLEMS BY SHISHKIN MESH SIMULATION. LATEST DEVELOPMENTS.

Bosco García-Archilla

Universidad de Sevilla, Depto. Matemtica Aplicada II, Camino de los Descubrimientos, s/n, 41002 Sevilla (Spain), bosco@esi.us.es

Key words: *Convection-dominated problems, Stabilized methods, Finite-element methods, Galerkin method, SUPG method.*

Shishkin mesh simulation is a novel technique to stabilize numerical methods for convection-diffusion problems. It is based on simulating that the grid is the coarse part of a Shishkin grid, although it can be applied on problems where Shishkin meshes are difficult to build, including domains with nontrivial geometries. The technique, which does not require adjusting any parameter, has been shown in [1] to outperform a good deal of methods of choice today in tests that include exponential and characteristic layers, interior layers, domains with curved boundaries and convection with vortices. In the present work, we present some refinements of this technique which were developed after [1], which include the extension to higher-order methods, as well as the transition from strongly convection-dominated problems to moderate convection.

REFERENCES

[1] B. García-Archilla. Shishkin mesh simulation: A new stabilization technique for convection-diffusion problems. *Comput. Methods Appl. Mech. Engrg.*, Vol. **256**, 1–16, 2013.