

Research Announcement

EFFICIENT GENERATION OF SHISHKIN MESHES IN SOLVING CONVECTION-DIFFUSION PROBLEMS

Neil Madden and Martin Stynes

A description of Shishkin meshes for resolving boundary and interior layers is given. It is shown how PLTMG can be used to construct such meshes with minimal effort. Several types of singularly perturbed convection-diffusion problems are solved on these meshes. These solutions are compared with those obtained on uniform meshes and on meshes adaptively refined by PLTMG; it is seen that Shishkin meshes yield much more accurate solutions with little additional computational effort. Full details appear in [1].

Reference

- [1] N. Madden and M. Stynes, *Efficient generation of Shishkin meshes in solving convection-diffusion problems* (1995) (Preprint 1995-2, Mathematics Department, University College Cork).

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ANALYSIS OF A CELL-VERTEX FINITE VOLUME METHOD FOR CONVECTION-DIFFUSION PROBLEMS

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The cell-vertex finite volume approximation of an elliptic convection-dominated diffusion equation is considered in two dimensions. The scheme is shown to be stable and second-order convergent in a mesh-dependent L_2 norm. Full details appear in [1].

Reference

- [1] K. W. Morton, M. Stynes and E. Süli, *Analysis of a cell-vertex finite volume method for convection-diffusion problems* (1994) (Report Number 94/6, Oxford University Computing Laboratory).

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