

A FULLY COUPLED FINITE VOLUME SOLVER FOR THE SOLUTION OF INCOMPRESSIBLE FLOWS ON LOCALLY REFINED NON-MATCHING BLOCK-STRUCTURED GRIDS

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Abstract. A fully coupled solver for the solution of steady laminar incompressible flow problems on locally refined non-matching block-structured grids that promises improved convergence properties is presented. For this a coupled velocity-pressure algorithm developed by Darwish [1] that solves the momentum and pressure equations simultaneously is extended correspondingly. The spatial finite-volume discretisation applied is of second-order accuracy. All blocks are implicitly coupled and the method is fully conservative. The newly developed method is verified via comparisons with manufactured solutions. Its performance is evaluated by systematic comparisons with standard segregated pressure-correction solution techniques for representative test cases.

REFERENCES

- [1] Darwish M.; Sraji, I. and Moukalled, F., A coupled incompressible flow solver on structured grids. *Numerical Heat Transfer, Part B* (2007) **52**:352-371.