

Numerical Method for Heat Transfer Problem in a Block Having an Interface

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Abstract : A finite volume method for quadrilaterals unstructured mesh is developed to predict the two dimensional steady-state solutions of conduction equation. In this scheme, based on the integration around the polygonal control volume, the derivatives of conduction equation must be converted into closed line integrals using same formulation of the Stokes theorem. To valid the accuracy of the method two numerical experiments s are used: conduction in a regular block (with known analytical solution) and conduction in a rotated block (case with curved boundaries).The numerical results show good agreement with analytical results. To demonstrate the accuracy of the method, the absolute and root-mean square errors versus the grid size are examined quantitatively.

Keywords : Stokes theorem, unstructured grid, heat transfer, complex geometry

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