IMPLICIT HIGHER-ORDER FINITE ELEMENT SOLUTION OF SYSTEMS OF PARABOLIC PDE'S IN 2D AND APPLICATIONS

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Abstract

The aim of the study presented has been to develop efficient software for the implicit higher-order FE solution of parabolic systems with a variable number of equations.

The software is sufficiently general to cover a wide class of models coming from either 2D or axisymmetric 3D electromagnetic, heat transfer, mechanical, chemical, coupled and/or other problems. Higher-order FE on unstructured grids are used for the spatial discretization. Then, the backward Euler scheme and/or implicit higher-order adaptive ODE solvers from numerical packages are employed. Sufficiently general time-dependent boundary conditions of all three basic types are considered.

Experience with the numerical solution of the arising sparse system of linear algebraic equations will be presented. Illustrative numerical examples will be shown.