

Implicit solution techniques for coupled multifield problems

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Abstract

Multifield problems are the norm rather than the exception. Fields may couple at a boundary (eg. Heat transfer) or within the volume (eg. Pressure-Velocity-Coupling, Multiphase-Flow). Due to the limitations imposed by segregated solvers, these problems are solved traditionally by reformulating until the remaining coupling can be handled through weak (explicit) coupling.

Over the past years, OpenFOAM's linear solver technology has been improved and two solver technologies have emerged, namely coupled matrices and block solution to deal with boundary and volume coupling more efficiently.

This presentation provides an overview of coupled matrices and block solution techniques. In addition, some applications and comparisons will be shown.