ID de Contribution: **4** Type: **Non spécifié**

Comparison of nonlinear field-split preconditioners for two-phase flow in heterogeneous porous media

mardi 17 octobre 2023 14:45 (1 heure)

This work focuses on the development of a two-step field-split nonlinear preconditioner to accelerate the convergence of two-phase flow and transport in heterogeneous porous media. We propose a field-split algorithm named Field-Split Multiplicative Schwarz Newton (FSMSN), consisting in two steps: first, we apply a preconditioning step to update pressure and saturations nonlinearly by solving approximately two subproblems in a sequential fashion; then, we apply a global step relying on a Newton update obtained by linearizing the system at the preconditioned state. Using challenging test cases, FSMSN is compared to an existing field-split preconditioner, Multiplicative Schwarz Preconditioned for Inexact Newton (MSPIN), and to standard solution strategies such as the Sequential Fully Implicit (SFI) method or the Fully Implicit Method (FIM). The comparison highlights the impact of the upwinding scheme in the algorithmic performance of the preconditioners and the importance of the dynamic adaptation of the subproblem tolerance in the preconditioning step.

Orateur: N'DIAYE, Mamadou