A posteriori error estimates, stopping criteria, and adaptivity for a two phase flow with exchange between phases as a nonlinear complementarity problem*

Jad Dabaghi

March 2, 2018

Abstract

We develop an a posteriori-steered algorithm for a two-phase compositional flow with exchange of components between the phases in porous media. The discretization relies on a backward Euler scheme in time and a finite volume scheme in space. The resulting nonlinear system is solved via an inexact semismooth Newton method treating the phase transition. Numerical experiments are given for the semismooth Newton-min algorithm and the GMRES solver, showing good quality of the estimates and of the adaptive stopping criteria.

*This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation program (grant agreement No 647134 GATIPOR).