

Hybrid Upwinding for Two-Phase Flow in Heterogeneous Media with Buoyancy and Capillary Pressure

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Hybrid Upwinding for Multiphase Flow with Strong Capillary Forces

We consider the simulation of multiphase flow and transport with strong capillary effects.

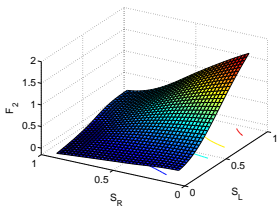
Challenges

- ▷ Highly nonlinear evolution of the transport problem.
- ▷ Discontinuous saturation-dependent coefficients between rock types.

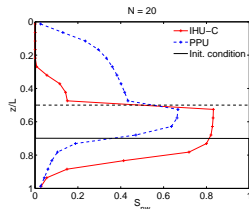
Contributions

Developed an efficient fully implicit finite-volume scheme that:

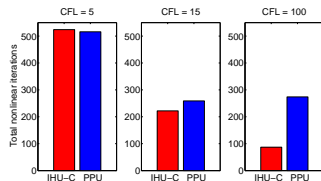
- ▷ Better predicts trapping by accurately capturing the entry pressure condition.
- ▷ Improves efficiency by reducing the number of nonlinear iterations.



Well-behaved numerical flux



Entry pressure condition captured more accurately



Improved nonlinear behavior