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# A stream function modeling method for incompressible two phases flow in porous media

*Thursday, 17 May 2018 13:00 (15 minutes)*

Oil and water incompressible flow is the main mechanics for water flooding oil production. There many numerical methods for this two phases flows, like full implicit, implicit pressure and explicit saturation and implicit pressure and implicit saturation and so on. The relative permeability of water and oil are not linear function of water saturation and so is the capillarity pressure. How to treat this nonlinear term is very important in numerical reservoir simulation. If they are not treated in a fitted manner, the iteration will not be convergence or not be stable. In this paper, a mass stream function is used to translated the pressure equation into a Laplace equation with constant diffusion coefficient, the relative permeability, gravity effect and capillarity pressure are cast into one order difference term treated as source term and treated explicitly. Solving this equation we can get Darcian velocity field. With this velocity field, water mass conservation is solved, we get the water saturation field. The disadvantage is that pressure can not get directed. The advantage is that the relative permeability term may be treated easily.

## References

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