ERROR ESTIMATE AND CONTROL IN THE MSFV METHOD FOR MULTIPHASE FLOW IN POROUS MEDIA

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Summary. In this paper the iterative MSFV method is extended to include the sequential implicit simulation of time dependent problems involving the solution of a system of pressure-saturation equations. To control numerical errors in simulation results, an error estimate, based on the residual of the MSFV approximate pressure field, is introduced. In the initial time steps in simulation iterations are employed until a specified accuracy in pressure is achieved. This initial solution is then used to improve the localization assumption at later time steps. Additional iterations in pressure solution are employed only when the pressure residual becomes larger than a specified threshold value. Efficiency of the strategy and the error control criteria are numerically investigated. This paper also shows that it is possible to derive an a-priori estimate and control based on the allowed pressure-equation residual to guarantee the desired accuracy in saturation calculation.