A Posteriori Error Estimate on Space-Time Discontinuous Galerkin Method for Solving Richard's Equation

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This work presents a posteriori error estimation for computing numerical solutions of the Richards equation. Proper error control during numerical computation is essential for obtaining accurate solutions and ensuring computational efficiency, especially for nonlinear flow problems in porous media. For a space–time discontinuous Galerkin formulation of the Richards equation, residual-based error estimators are derived that provide reliable indicators of discretization error. These estimators are then used to guide adaptive mesh refinement in both space and time. A couple of numerical experiments demonstrate the usefulness of the proposed estimators.