NUMERICAL SIMULATION APPLIED TO CO_2 SEQUESTRATION INTO SALINE AQUIFERS

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Abstract. The CO_2 storage into saline aquifers is considered a potential method to mitigate the greenhouse effect. Describing the storage of CO_2 injected into subsurface formation requires an accurate fluid model. The mathematical model which represents fluid flow in porous media is built by combining the mass conservation equations with Darcy's empirical law. Besides these governing equations, state equations (thermodynamic model) and a reservoir description (geological model) must be given, together with a set of initial and boundary conditions. In this work we apply the well-known Black-Oil formulation of two phase, two component fluid flow, which uses the PVT data, a simplified thermodynamic model. In this fashion we simulate the simultaneous flow of brine and CO_2 allowing CO_2 to be dissolved in the formation brine. The numerical procedure employs a global hybridized mixed finite element method to obtain the approximate solution. Examples showing the implementation of the algorithm in the 1D case are presented.