عنوان مقاله:

Non-Equilibrium Model of Three-Phase Flow in Porous Media

محل انتشار:

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خلاصه مقاله:

Accurate description of multiphase flow in porous media is crucial for practical applications like enhanced oil recovery and environmental remediation of the unsaturated zone. Multiphase flow models are conventionally based on an extension of Darcy's law. Available models generally assume that capillary pressure and relative permeability are unique functions of saturation. However, new theories highlights that a dynamic term should be included to indicate the time at which flow equilibrium is reached. In this work a generalized non-equilibrium model of three-phase flow in porous media is developed. Non-equilibrium effects is introduced by a pair of effective water and gas saturations related to the actual saturations by the extension of Barenblatt model to three-phase systems considering dynamic effects in both relative permeability and capillary pressure functions. While equilibrium formulation develops unstable oscillatory behavior in the elliptic region, non-equilibrium solution is smooth and stable. The developed model might be helpful for the analysis of three-phase gravity drainage problems

کلمات کلیدی:

Three-phase flow, Non-equilibrium effects, Riemann problem, Elliptic regions

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