Mathematical modeling of the various modes of two-phase filtration of hydrocarbon mixtures

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Because of reducing extraction of a dry gas deposits an active development of gas condensate fields will definitely become. Theoretical and experimental results, demonstrating the existence in filtering task periodic solution, are known. Considering gas condensate mixture as an oscillating system make possible the usage of special methods to define its main characteristics such as natural frequencies. There are many conditions of hydrocarbon production, but all of them have one common physical phenomenon—the formation of “condensate cork”. Math and lab modeling can describe such process. The article contains the system of differential equations for two-phase two component mixture. The solution of it includes pressure, saturation and mass fractions. Program FlexPDE provides the system with solution, using finite element technique. As a result comparative distribution of velocity, pressure, saturation and phase composition are received. Moreover program is able to differ equilibrium and nonequilibrium processes. Calculations show that deviation from thermodynamic equilibrium contributes gas flow rate growth and liquid flow rate reduction. Modeling in such way suppose to distinguish main physical processes, which filtering mixture depends on; give it a quantitative assessment and finally create methods leading to more effective ways of field development.