Numerical Transient Analysis of Pressure in Petroleum Reservoir

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Abstract: This work regards oil flow in petroleum reservoirs. It is an analysis that aims the study of monophasic oil flow in porous media through the Diffusivity Equation's analytical solution for a radial, transient flow when varying reservoir and fluid parameters. This solution is especially important for preliminaries studies of petroleum reservoir regarding its economic and technical production viability for a qualitative understanding of the flow in the reservoir. In addition, a numerical model based on the Finite Difference Method (FDM) is implemented to solve the radial flow and relax the simplifying hypothesis used to solve the governing equation analytically. The numerical, more realistic, solution is compared to the analytical solution and the effects of the simplifying hypotheses of the model are further discussed.

Keywords: Transient Analysis, Finite Difference Method, Petroleum Reservoir, Diffusivity Equation, Analytical Analysis