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Hydrodynamic waves and disturbances in nonlinear porous media and filtration parameters estimation

The saturated porous media are heterogeneous under natural conditions in most situations. This fact complicates the calculation of the filtration parameters such as transmissibility and diffusivity coefficient and there is an additional difficulty associated with the nonlinearity also. First of all we have to note the essential permeability nonlinear dependence from the pressure in fracture porous media. Thus, the problem of the heterogeneity and nonlinearity contributions separating emerges when we run the buildup well tests. In this case appropriate results can be obtained using pulse tests and multiple pulses tests in the form of harmonic waves in addition to the standard buildup tests. We have studied the shape of the time dependence pressure curves using numerical simulation of nonlinear diffusivity equation. The dependence of the permeability on the pressure was approximated by realistic exponential and hyperbolic functions. The results of research show the possibility of the nonlinearity influence separation on the integral shape of the pressure curves.

Biography

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