

Periodic pulse testing in porous media with nonlinear permeability dependence versus pressure

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Abstract

© 2006-2018 Asian Research Publishing Network (ARPN). The filtration pressure waves propagations in nonlinear media are considered for two models pressure dependences of permeability. The differences of the amplitudes and phases hydrodynamic periodic pulse testing signals are calculated for nonlinear and analogous linear situations. These differences can reach unity and tens of percents. Obtained results can be used in correction the values of the filtration parameters.

Keywords

Nonlinear filtration of fluids, Periodic pulse testing, Porous and fractured porous media

References

- [1] Earlougher Robert C. 1977. *Advances in Well Test Analysis*. New York-Dallas: SPE
- [2] Scheidegger A.E. 1974. *The physics of flow through porous media*. 3d edition. Toronto: Univ. of Toronto Press
- [3] Wodie J-C., Levy T. 1991. Correction non lineaire de la loi de Darcy. *C. R. Acad. Sci. Paris. Serie II*: 157-161
- [4] Nikolaevskij V.N. 1990. *Mechanics of Porous and Fractured Media*. Singapore: World Scientific
- [5] Meyer R. 2002. Anisotropy of sandstone permeability. *CREWES Research Report*. 14: 1-12
- [6] Hassansadeh H., Pooladi-Darvish M., Atabay S. 2009. Shape factor in the drawdown solution for well testing of dual-porosity systems. *Advances in Water Resources*. 32: 1652-1663
- [7] Buzinov S.N. 1960. The reservoirs and well surveys with the harmonic reservoir excitation. *Herald of Academy of Science of the USSR. Mechanics and Engineering*. 4: 48-52. [in Russian]
- [8] Johnson C., R. Greenkorn and E. Woods. 1966. Pulse Testing: A new method for describing reservoir flow properties between wells. *J. Petroleum Technology*. 18: 1599-1604
- [9] Renner J. and M. Messar. 2006. Periodic pumping tests. *Geophys. J. Int.* 167: 479-493
- [10] Ovchinnikov A.N. 2016. Time dimension parameters of the dual-porosity reservoir determination using periodic hydraulic pulse testing. *American Journal of Environmental Sciences*. 9: 328-333
- [11] Ovchinnikov A.N., Kushtanova G.G. 2016. Effective matrix block sizes in percolation model and filtrational parameters of fractured environments. *ARPN Journal of Engineering and Applied Sciences*. 11(13): 8139-8143
- [12] G. I. Barenblatt G.I., Entov V.M., Ryzhik V.M. 1984. *Motion of Liquids and Gases in Natural Strata* [in Russian], Moscow: pp. 104-114
- [13] Warren J.E., Root P.J. 1963. The behaviour of naturally fractured reservoirs. *Soc. Pet. Eng. J.* 3: 245-255
- [14] Van Golf-Racht T.D. 1982. *Fundamentals of fractured reservoir engineering*. Elsevier, Amsterdam