Validity of Series and Parallel Bed Layer Permeability Equations

Alabi, Olusegun O.
Solid Earth Research Laboratory
Department of Physics
Osun State University
Osogbo, Nigeria
E-mail: olusegun.alabi@uniosun.edu.ng

ABSTRACT

It is rare to encounter a homogeneous reservoir in actual practice. More formations have a space variations of permeability. They are more variable than porosity and difficult to measure. Yet an adequate knowledge of permeability distribution is critical to the prediction of reservoir depletion or by-pass hydrocarbon recovery. Average method is used to determine the average permeability of series (or vertical) and parallel (or horizontal) beds with different permeability. The aim of this work is to verify the validity of the average method by comparing it with the experimental results. The volumetric discharge was determined for both series and parallel layered beds and Darcy's equation was used to the determined the hydraulic conductivity (HC). Experimental permeability (EP) was determined from HC by Hubbert King's relation. The results of computed average permeability (CP) were compared with EP and it was found that there is no significant difference between the CP and EP for parallel beds layered (PBLP). However, there is a significant difference between the CP and EP for series beds layered (SBLP). The results also corroborate the fact that SBLP is always greater than PBLP. Also, it was found that the value PBLP is not exactly doubled the value of SBLP, but very close.

Keywords: Validity, Series, Parallel Bed Layer, Permeability Equations, Hydraulic Conductivity

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