## عنوان مقاله:

An Analytical Solution for One-dimensional Horizontal Imbibition in a Cocurrent Flow

## محل انتشار:

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## خلاصه مقاله:

Cocurrent spontaneous imbibition (COCSI) of an aqueous phase into matrix blocks arising from capillary forces is an important mechanism for petroleum recovery from fractured petroleum reservoirs. In this work, the modeling of countercurrent imbibition is used to develop the appropriate scaling equations. Considering the imbibition process and the water and oil movement respectively as the wet phase and the non-wet phase in a block saturated by oil and surrounded by two vertical fractures full of water, a differential equation having partial and nonlinear derivatives is introduced using Darcy and mass balance equations. On the other hand, as there is no analytical solution for this equation, a new equation is introduced by considering the different intervals of the wet and non-wet phase viscosity and by selecting the best suitable functions for relative permeability and capillary pressure. Considering the boundary conditions governing the countercurrent imbibition, an analytical solution (equation) is developed. Finally, the developed equation is validated. The results of this research can be very important for a better understanding of the imbibition process and the water and oil movement in the fractured environments.

## کلمات کلیدی:

Fractured Reservoirs, Porous media, Spontaneous Imbibition, Analytical Solution