Abstract

The Flow through saturated-unsaturated porous media is extremely important in various natural and industrial based applications. While the Darcy's law with various modifications are used to model the flow through a porous media, the flow through unsaturated porous media is largely based on conservation of mass and modified Darcy's law where non-linear relationship exists between the pressure head and the fluid saturation coupled with fluid density variations. This paper represents mathematical modelling of flow through unsaturated porous
media using constant and variable fluid density. The variable density model is further split into thermal and Isothermal models. The mathematical model is applied to an unsaturated porous media filled with water and oil having immiscible flow. The variables describing the models like permeability, capillary pressure, fluid saturation and their constituent relations are considered. The models are extremely important for different industrial applications like enhancing oil recovery, sea water filtration, nuclear waste disposal, chemical clean-up of soil, underground hydrology, soil physics etc.

References

- F. E. Teruel and Rizwan-uddin, "Characterization of a porous medium employing


- J. Bear, Dynamics of fluids in porous media, Amsterdam: Elseview, 1972.
- N. S. • B. F. • R. H. • B. I. Wohlmuth, "Dimensionally reduced flow models in fractured porous media: crossings and boundaries," Funded by German Research Foundation (DFG) within the International Research Training Group, University of Stuttgart, 2015.


Index Terms

Computer Science

Information Sciences

Keywords

Immiscible Flow