

Abstract

The Study of Fluid Flows in Naturally Permeable Channels

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Steady flow of two immiscible fluids past permeable membranes is studied. Velocity profiles are calculated analytically by solving Navier-Stokes, Brinkman and Darcy equations. A combination of Brinkman and Darcy models is employed in this study. Expressions for the velocity distributions in the porous and non-porous regions are gathered, and mass flow rates are obtained. Graphs inspired by Beavers and Joseph, and Bhatt are obtained using Matlab; these show increase in mass flow rate past porous as opposed to solid membranes. Results obtained in this project are similar to those generated by the aforementioned authors.

Keywords: Dayle Chandan Jogie; Brinkman; Darcy; Porous; Immiscible; Fluids; Bhatt; Beavers and Joseph.