

## **MATHEMATICAL MODEL FOR TIME DEPENDENT FLOWS IN A DENSELY PACKED POROUS LAYER**

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### **ABSTRACT**

This paper deals with the analytical investigation of a mathematical model to study the time dependent porous convection in a densely packed porous layer. Here, the medium is not only a two-phase system but also has a modulated environment. The model happens to be a Darcy model with the stress free planar boundaries. Stability analysis is performed in detail by the extended Stuart-Davis technique in order to know the qualitative as well as the quantitative features of the phenomenon. The time variation is introduced by oscillating the layer in the vertical direction. All the physical quantities like, volume expansion coefficient, kinematic viscosity, permeability, thermal diffusivity etc. are assumed to be constants. The profiles of velocity and temperature strongly depend on the type of modulation.

**KEYWORDS:** Time Dependent Flows, Densely Packed Porous Layer, Modulated Environment