

## Transient/Steady Natural Convective Flow of Reactive Viscous Fluid in Vertical Porous Pipe

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**Abstract :** This paper presents the effects of suction/injection of transient/steady natural convection flow of reactive viscous fluid in a vertical porous pipe. The mathematical model capturing the time dependent flow of viscous reactive fluid is solved using implicit finite difference method while the corresponding steady state model is solved using regular perturbation technique. Results of analytical and numerical solutions are reported for various parametric conditions to illustrate special features of the solutions. The coefficient of skin friction and rate of heat transfer are obtained and illustrated graphically. The numerical solution is shown to be in excellent agreement with the closed form analytical solution. It is interesting to note that time required to reach steady state is higher in case of injection in comparison to suction.

**Keywords :** porous pipe, reactive viscous fluid, transient natural-convective flow, analytical solution

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