P R E F A C E

This dissertation entitled "Solution of Navier-Stoke's Equations" contains two chapters.

First chapter is introductory which deals with the brief history of viscous theory and we enlisted fundamental equations of the flow of viscous fluids, some exact and approximate solutions of Navier-Stoke's equations and also some major developments in these solutions.

The second chapter covers the study of the Navier-Stoke's in porous media. Firstly in this chapter we gave some basic concepts as prerequisite for the problems to be discussed. Then we enlisted brief survey and major developments in the flow problems through porous media. Secondly, we have studied the problem of flow in convergent and divergent porous channels following the formalism of Jaffery, G.B.(1915) and Hamel, G (1916). Also we discussed Generalized plane couette flow between two porous plates and obtained velocity distribution in the form

$$u = \left[\frac{U - \frac{P}{\rho V_o} h}{e^{\frac{V_o}{\nu} h} - 1} \right] \left[e^{\frac{V_o}{\nu} y} - 1 \right] + \frac{P}{\rho V_o} y$$

Further we studied Generalized plane couette flow between two coaxial infinite porous cylinders when the inner cylinder

is moving with constant velocity V and outer is at rest and obtained the velocity distribution in the form

$$u = -\frac{P}{2(2-m)\mu}\left[r^2 - b^2 - \frac{b^2-a^2}{b^m-a^m}(r^m-b^m)\right] + U\frac{b^m-r^m}{b^m-a^m}$$

Lastly we obtained the velocity distribution in the case of spiral flow between two coaxial cylinders when the outer and inner cylinders are rotating with constant angular velocities

$$v = \frac{1}{(b^2-a^2)}\left[(b^2 w_2 - a^2 w_1)\, r - \frac{a^2b^2}{r}(w_2 - w_1)\right]$$

and

$$w = \frac{U \log (r/b)}{\log (a/b)}$$

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