P R E F A C E

This dissertation entitled "Problems in boundary Layer theory" contains two Chapters.

First Chapter is introductory which deals with the brief history of the boundary layer theory. In this chapter we enlisted some major developments in this theory by various research workers and also gave some basic concepts as prerequisite for the problems to be discussed in the second chapter.

The second chapter covers the study of approximate methods for the solution of the boundary layer equations. Firstly in this chapter we have studied boundary layer with suction along the porous plate following the formalism of Head, M.R. (1961) and Prasad, S. (1982) by using Tani's flow (1949) and obtained the momentum integral equation, the kinetic energy integral equation and the compatibility condition respectively in the following form

$$\frac{dt^*}{d\bar{x}} = \frac{2}{1-\bar{x}^3} \left[I + 3\bar{x}^2 \, t^* \, (H + 2) + \frac{\theta}{\delta} \lambda \right] \quad \ldots \text{(i)}$$

$$\frac{dH_\epsilon}{d\bar{x}} = \frac{1}{t^*(1-\bar{x}^3)} \left[2D - H_\epsilon \left\{ I + 3\bar{x}^2 \, t^* \, (H-1) + \frac{\theta}{\delta} \lambda \right\} + \frac{\theta}{\delta} \lambda \right] \quad \ldots \text{(ii)}$$

and

$$\frac{\theta^2}{\delta^2} \left[(\lambda^2 + 15\lambda + 90) K + 100.17 \lambda \right] + \frac{135t^*}{a^2} = 0 \quad \ldots \text{(iii)}$$

Secondly, we have studied Laminar incompressible boundary layer along a porous circular cylinder following the work of Schlichting, H. (1949), Head, M.R. (1957) and Ram Deo Mahto (1983) and obtained the momentum integral equation, the kinetic energy integral equation and the compatibility condition respectively in following form.

$$\frac{dt^*}{d\theta} = \frac{1}{\sin\theta}\left[(I + \sigma) + 2(H + 2)\, t^* \cos^2\theta\right] \quad \ldots (iv)$$

$$\frac{dH_\epsilon}{d\theta} = \frac{1}{2t^*\sin\theta}\left[(2D + \sigma) + H_\epsilon\left\{(I + \sigma) - 2(H - 1)t^*\cos^2\theta\right\}\right] \quad \ldots (v)$$

and $$(K+1)\frac{\theta^2}{\delta^2} + \sigma\frac{\theta}{\delta}\left\{1 + k\left(1 - \frac{\pi}{\sigma}\right)\right\} - 2\cos^2\theta = 0. \quad \ldots (vi)$$

Further we have studied the boundary layer for Tan's flow (i) past a wedge and (ii) along the wall of a convergent channel.

Lastly we have given the list of major developments in the field of applications of approximate methods to the bodies of revolution and three dimensional boundary layer and made discussions on above problems.

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