The City University of New York

The City College of New York

Department of Mechanical Engineering

Homework 3

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1 a) Vorticity Field

2 b) Streamline Equation

$$-\frac{t^2\ (\sinh(\text{lambdan}\, y) - \sinh(\text{lambdan y0}))}{\text{lambdan v0}\ (\sin(\text{betan}\, t) - \text{betan}\, t\ \cos(\text{betan}\, t))} - \frac{t^2\ (\cosh(\text{etan}\, x) - \cosh(\text{etan x0}))}{(-1)^n\, \text{etan u0}\ (\cos(\text{alphan}\, t) + \text{alphan}\, t\ \sin(\text{alphan}\, t))} \tag{1}$$

3 c) Pathline Equation

$$x = \frac{\operatorname{arccosh}\left(-\frac{(-1)^n\, \text{etan u0}\ \cos(\text{alphan}\, t)}{t}\right)}{\text{etan}} \tag{2}$$

$$y = \frac{\operatorname{arcsinh}\left(\frac{\text{lambdan v0}\ \sin(\text{betan}\, t)}{t}\right)}{\text{lambdan}} \tag{3}$$

$$\tag{4}$$

4 d) Streakline Equation

$$x = \frac{\operatorname{arccosh}\left(-\frac{(-1)^n\, \text{etan u0}\ \cos(\text{alphan}\, 3)}{3}\right)}{\text{etan}} \tag{5}$$

$$y = \frac{\operatorname{arcsinh}\left(\frac{\text{lambdan v0}\ \sin(\text{betan}\, 3)}{3}\right)}{\text{lambdan}} \tag{6}$$

$$\tag{7}$$

5 Tabulated Data

6 Analysis

7 Appendix