

ERRATA

Fluid Mechanics – A Problem Solving Approach by Uddin (CRC Press)

Pg 8:

$$\beta = \left(\frac{\partial V}{\partial T} \right)_p = \frac{-1}{\rho} \left(\frac{\partial \rho}{\partial T} \right)_p$$

Should be corrected as

$$\beta = V \left(\frac{\partial V}{\partial T} \right)_p = \frac{-1}{\rho} \left(\frac{\partial \rho}{\partial T} \right)_p$$

Pg 15, Ex 1.3

The final solution is printed as

$$\tau_{rz}|_{r=r_o} = \frac{\mu_o U_o^m}{r_o^m} \left(\frac{m+1}{m} \right)^m$$

Should be corrected as

$$\tau := \frac{(-1)^m \mu_o U_o^m \left(\frac{m+1}{m} \right)^m}{r_o^m}$$

Pg 52: In Example 2.8

The length of the inclined surface is 0.5 m and the width is 0.6 m.

Should be corrected as

The length of the inclined surface is 0.6 m and the width is 0.5 m.

Pg 53: In Example 2.8

$$z_R = z_{cen} + \frac{I_{xxc}}{A} = 1.43 \text{ m}$$

Should be corrected as

$$x_R = x_{cen} + \frac{I_{xz,cen}}{z_{cen} \cdot A}$$

Pg 65 Ex 3.2

$$\vec{V} = \sqrt{16y^2 + x^2 - 14x + 49 + 9z^2}$$

At origin ($x = y = z = 0$), we have $\vec{V} = 7$.

At y-axis ($x = z = 0$), we have:

$$\vec{V} = \sqrt{16y^2 + 80y + 149}$$

Correct is

$$\sqrt{4.x^2 + 16.y^2 + 9.z^2 - 28.x + 80.y + 149.}$$

$$12.20655562$$

V=

Pg 72

Example A velocity field in fluid is given by:

$$\vec{V} = 3xy^3\hat{i} + 3xy\hat{j} + (3zy + 4t)\hat{k}$$

Find

- (i) magnitude and direction of u , v , and w velocity components
- (ii) vorticity vector

Add in question statement

At $x=3.6666, y=1, z=1$.

Pg 91

If we consider incompressible flow then density will be removed from this equation, and the equation will be reduced to form:

$$\nabla(\vec{V}) = 0$$

Should be corrected as

$$\nabla \cdot \vec{V} = 0$$

Pg 195:

$$u(y) = \frac{-1}{2} \left(\frac{1}{\mu} \frac{\partial P}{\partial x} \right) [y^2 - h^2]$$

The substitution β is introduced to make the analysis simple:

Should be corrected as

$$u = \frac{\beta}{2} (h^2 - y^2)$$

Pg 201:

$$u = \frac{dP}{dz} \frac{r^2}{4\mu} - \frac{dP}{dx} \frac{r_w^2}{4\mu} \quad (8.5)$$

This equation should be read as

$$u = \frac{dP}{dz} \frac{r^2}{4\mu} - \frac{dP}{dz} \frac{r_w^2}{4\mu}$$

Pg 379

~~$$A = \frac{-ca}{\sinh(mh) \cos(m\pi)}$$~~

The correct is

Since at $x=\pi/2, \eta=a$

$$A = \frac{-ca}{\sinh(mh) \underbrace{\sin(m\pi/2)}_1}$$

Pg 385

$$w = \frac{\partial \psi}{\partial z}$$

Should be taken as

$$w = -\frac{\partial \psi}{\partial x}$$

Pg 385

The stream function we have already defined as:

$$\psi(x, \eta) = c\eta + A \sinh(mh + m\eta) \sin(mx)$$

Should be read as

$$\psi(x, z) = c \cdot z + A \cdot \sinh(m \cdot h + m \cdot z) \cdot \sin(m \cdot (x - c \cdot t))$$