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** $\tau_{rz}\big\|_{r=r_o} = \frac{\mu_o U_o^m}{r_o^m}\left(\frac{m+1}{m}\right)^m$ **Should be corrected as** $\tau := \frac{(-1)^m \mu o\ Uo^m \left(\frac{m+1}{m}\right)^m}{ro^m}$
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 $z_R = z_{cen} + \frac{I_{xxc}}{A} = 1.43\ m$ 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

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

V= 12.20655562

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 reduced to form:

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

Should be corrected as

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

Pg 195:

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

The substitution β is introduced to make the analysis simple:

Should be corrected as

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

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

$$A = \frac{-ca}{\sinh(mh)\underbrace{\cos(m\pi)}_{1}}$$

The correct is

Since at x=π/2, η=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

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

Pg 417:

The speed of sound or the posted speed is the speed at which an infinite chasm of a small pressure wave travels in the matter

Correct: The speed of sound or the acoustic speed is the speed at which a small pressure wave travels in the matter

Pg 425

Figure 16.5 The movement of a military aircraft at a speed ~~higher than~~ the acoustic speed.

close to

u, far greater than the speed at which the sphere is moving in the medium. The β is the cone half angle in a 2D plane. Note that the type of shockwave that is formed is an oblique shockwave. Figure 16.5 shows the movement of a military aircraft at a speed ~~higher than~~ the acoustic speed.

approaching