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Deen, *Analysis of Transport Phenomena*

Errata for First and Second Printings

p. 40 In the energy equation for spherical coordinates in Table 2-2,

$$...\frac{1}{r^2}\frac{\partial}{\partial r}\left(r^2\frac{\partial T}{\partial r}\right)... \text{ not } ...\frac{1}{r^2}\frac{\partial}{\partial r}\left(r\frac{\partial T}{\partial r}\right) \quad .$$

p. 43 In last line of text, "$b = p\hat{H}$" should read "$b = \rho\hat{H}$."

p. 78 In Eq. (3.2-22), y should be Y.

p. 82 In Eq. (3.3-7), "$Bi << 1$" not "$Bi >> 1$."

p. 87 In Eq. (3.4-7), second equation, "$\partial C/\partial x$" not "$\partial C/\partial X$."

p. 138 In Eq. (4.2-18), middle term of second line, change "Θ_n" to "Θ."

p. 162 In Eq. (4.5-73), $\sin(n\pi y/b)$ should be $\sin(m\pi y/b)$.

p. 163 In last line of Eq. (4.5-78), $(n\pi)^2$ should be $(n\pi/a)^2$.

p. 163 In Eq. (4.5-79), $(m\pi)^2$ should be $(m\pi/b)^2$.

p. 163 Eq. (4.5-81) should read

$$\frac{d^2\Theta_{nm}}{dz^2} - \left[(n/a)^2 + (m/b)^2\right]\pi^2\Theta_{nm} = 0 \quad .$$

p. 163 In Eq. (4.5-83), Θ_n should be Θ_{nm} (two places).

p. 164 Eq. (4.5-84) should read

$$\Theta_{nm}(z) = \frac{2\sqrt{ab}}{nm\pi^2}\left[1-(-1)^n\right]\left[1-(-1)^m\right]\frac{\sinh\left\{\left[(n/a)^2+(m/b)^2\right]^{1/2}\pi z\right\}}{\sinh\left\{\left[(n/a)^2+(m/b)^2\right]^{1/2}\pi c\right\}}$$

p. 164 Eq. (4.5-85) should read

$$\Theta(x,y,z) = \frac{16}{\pi^2} \sum_{\substack{n=1 \\ n \text{ odd}}}^{\infty} \sum_{\substack{m=1 \\ m \text{ odd}}}^{\infty} \frac{1}{nm} \frac{\sinh\left\{\left[(n/a)^2 + (m/b)^2\right]^{1/2} \pi z\right\}}{\sinh\left\{\left[(n/a)^2 + (m/b)^2\right]^{1/2} \pi c\right\}} \sin\left(\frac{n\pi x}{a}\right) \sin\left(\frac{m\pi y}{b}\right)$$

p. 185 In Eq. (4.8-59), bold "**∇**."

p. 222 In each equation of Table 5-1, the last term on the left-hand side should be of the form $v_z \partial v_i / \partial z$, not $v_z \partial v_i / \partial t$. There are several other errors in the last equation, which should read

$$\rho\left[\frac{\partial v_z}{\partial t} + v_x \frac{\partial v_z}{\partial x} + v_y \frac{\partial v_z}{\partial y} + v_z \frac{\partial v_z}{\partial z}\right] = \rho g_z - \frac{\partial P}{\partial z} + \left[\frac{\partial \tau_{xz}}{\partial x} + \frac{\partial \tau_{yz}}{\partial y} + \frac{\partial \tau_{zz}}{\partial z}\right] \quad .$$

p. 227 In Table 5-5 the expression for $\tau_{r\theta}$ should read

$$\tau_{r\theta} = \tau_{\theta r} = \mu\left[r \frac{\partial}{\partial r}\left(\frac{v_\theta}{r}\right) + \frac{1}{r} \frac{\partial v_r}{\partial \theta}\right] \quad .$$

p. 236 In the text immediately above Eq. (5.7-11), change "Eq. (5.7-11)" to "Eq. (5.7-9)."

p. 237 Line 5, "Eq. (A.8-24)" not "Eq. (A.8-25)."

p. 242 Equation (5.9-13d) should be

$$E^2 \psi = -(r \sin\theta) w_\phi \quad .$$

p. 249 In the first line of Problem 5-2, part (b), delete "or axisymmetric." That is, the equation in part (b) is valid only for planar flows.

p. 250 In the equation in Problem 5-7(b), "*d***r**/*dt*" not "*d***r**/*dr*."

p. 276 Replace last period by hyphen in labels of Eqs. (6.6-35), (6.6-38), and (6.6-39).

p. 296 In Eq. (7.3-10), "$\partial/\partial r$" not "d/dr."

p. 301 Include a minus sign on the right-hand side of Eq. (7.4-18), such that

$$v_\theta(\theta) = -\frac{U}{(\pi^2/4)-1}\left[\frac{\pi}{2}\left(\frac{\pi}{2}-\theta\right)\sin\theta - \theta\cos\theta\right] \quad .$$

p. 338 Three lines above Eq. (8.2-20), "$\partial\tilde{\mathcal{P}}/\partial\tilde{y}$" not "$\partial\tilde{\mathcal{P}}\partial\tilde{y}$."

p. 338 One line below Eq. (8.2-20), "$O(\tilde{\delta}^2)$" not "$O(\tilde{\delta})$."

p. 354 Line 11 of text: "Eq. (8.4-33)" not "Eq. (8.3-33)."

p. 360 Line 2, "Eq. (8.5-21)" not Eq. (8.5-22)."

p. 361 Eq. (8.5-28), first symbol in numerator should be "p" not "ρ."

p. 361 Three lines from bottom, add prime to last term in text equation, so that it reads

"$(ff')' = ff'' + (f')^2$."

p. 362 Two lines below Eq. (8.5-41), "Eq. (8.5-41)" not "Eq. (8.5-40)."

p. 365 Problem 8-4(d), line 2, "separation" not "stagnation."

p. 366 Problem 8-6(a), insert minus sign in first equation, such that

$$\psi(r,z) = -\nu z^p F(\eta) \quad .$$

p. 368 The last differential equation in Problem 8-9(b) should read

$$G'' - 2FG - HG' = 0 \quad .$$

p. 427 Equation (10.4-12) should be

$$\frac{1}{k_{NO}^{(O)}} = \frac{1}{k_{NO}^{(L)}} + \frac{K_{NO}}{k_{NO}^{(G)}} \quad .$$

The text immediately below the equation should read:

"where K_{NO} is the liquid-to-gas concentration ratio at equilibrium (0.047 at 23˚C). Because the Péclet number is large..."

p. 427 The text below Eq. (10.4-15) should read:

"Together with the small value of K_{NO}, this indicates that the mass transfer resistance in the gas is negligible. Thus, the overall mass transfer coefficient essentially equals that in the liquid."

p. 486 In Eq. (12.3-3), $\eta \equiv y/H$ not $\eta \equiv y/W$.

p. 530 In the third line of Example 13.4-1, "(13.3-22)" not "(13.2-22)."

p. 535 Brackets are mismatched in Eq. (13.4-39): there should be a large square (not curved) bracket immediately to the left of the equals sign.

p. 546 The complete list of authors in the Sureshkumar reference is:

"Sureshkumar, R., R. A. Handler, and A. N. Beris."

p. 554 In Eq. (A.2-6), "$\boldsymbol{\tau} - \boldsymbol{\tau}^t = ...$" not "$\boldsymbol{\tau} = \boldsymbol{\tau}^t = ...$"

p. 565 In Eqs. (A.5-4) and (A.5-5), "*dS*" not "*ds*."

p. 566 In Eq. (A.5-10), "dV" should be in italics (two places).

p. 574 One line below Eq. (A.7-30c), "Eq. (A.7-30)" not "Eq. (A.6-30)."

p. 577 Change the last derivative in Eq. (2) of Table A-4, such that

$$\nabla \cdot \mathbf{v} = \frac{1}{r^2}\frac{\partial}{\partial r}\left(r^2 v_r\right) + \frac{1}{r\sin\theta}\frac{\partial}{\partial\theta}\left(v_\theta \sin\theta\right) + \frac{1}{r\sin\theta}\frac{\partial v_\phi}{\partial\phi} \quad .$$

p. 578 Insert $\mathbf{e}_z$ at the end of Eq. (A.8-5), so that it reads

$$\mathbf{B} = \frac{\partial \mathbf{r}_s}{\partial y} = (0)\mathbf{e}_x + (1)\mathbf{e}_y + \frac{\partial F}{\partial y}\mathbf{e}_z \quad .$$

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p. 574 One line below Eq. (A.7-30c), "Eq. (A.7-30)" not "Eq. (A.6-30)."

p. 578 The last term in Eq. (A.8-5) should read

$$\frac{\partial F}{\partial y}\mathbf{e}_z \text{ not } \frac{\partial F}{\partial y \mathbf{e}_z} \quad .$$