

**Deen, *Analysis of Transport Phenomena***

**Errata for First and Second Printings**

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

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

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

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

**p. 82** In Eq. (3.3-7), " $Bi \ll 1$ " not " $Bi \gg 1$ ."

**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 " $\Theta_n$ " to " $\Theta$ ."

**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

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

**p. 163** In Eq. (4.5-83),  $\Theta_n$  should be  $\Theta_{nm}$  (two places).

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

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

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 “ $\nabla$ .”

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

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

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

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

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

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

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), “ $d\mathbf{r}/dt$ ” not “ $d\mathbf{r}/dr$ .”

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

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

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 " $\rho$ ."

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

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

p. 427 Equation (10.4-12) should be

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

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), " $\boldsymbol{\tau} - \boldsymbol{\tau}^t = \dots$ " not " $\boldsymbol{\tau} = \boldsymbol{\tau}^t = \dots$ "

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

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

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

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