Known Typographical Errors in the Fifth Edition, First Printing of Basic Fluid Mechanics by D. C. Wilcox

These are all of the known typographical errors as of October 4, 2015.

1. Page 48, Problem 1.88, Part (c): Replace “Solve for $\eta$ in terms of $K$, $n$, $R$, $h$ and $U$” with “Solve for $T$ in terms of $K$, $n$, $R$, $h$, $f$ and $U$”.

2. Page 72, Example 2.8: In the second and fourth paragraphs, change \((\mu_p/a_p)/(\mu_m/a_m)\) to \((\mu_m/a_m)/(\mu_p/a_p)\). There are several minor arithmetic errors as follows. In line two of the second paragraph, change $\mu_m = 1.82 \cdot 10^{-5}$ to $\mu_m = 1.81 \cdot 10^{-5}$. The equation for $U_m/U_p$ just below the second paragraph should be

$$\frac{U_m}{U_p} = \frac{343 \text{ m/sec}}{295 \text{ m/sec}} = 1.16$$

In the second line of the third paragraph, change “17%” to “16%”. In the equation for $F_p/F_m$, change “1.17” to “1.16” and change “2.41” to “2.44”.

3. Page 177, Problem 4.3(b): The left parenthesis is out of place. The correct equation is

$$\mathbf{u} = -\frac{D}{2\pi r^2} (\cos \theta \mathbf{e}_r + \sin \theta \mathbf{e}_\theta)$$

4. Page 177, Problem 4.6(b): Change “$u = -x/t$” to “$u = -x/t \mathbf{i}$”.

5. Page 179, Problem 4.23: Change “$\mathbf{u} = \Gamma/(2\pi r) \mathbf{e}_r$” to “$\mathbf{u} = \Gamma/(2\pi r) \mathbf{e}_\theta$”.

6. Page 180, Problem 4.29: Change “$\mathbf{u} = (u/R)$” to “$\mathbf{u} = (U/R)$”.

7. Page 181, Problem 4.42: Change “$\mathbf{u} = U\mathbf{i} + \delta U(x/H)^2 \mathbf{j}$” to “$\mathbf{u} = U\mathbf{i} + \delta U(x/h)^2 \mathbf{j}$”.

8. Page 212, Problem 5.36, figure: For the diameter of the left tube, replace “2d” with “3d”.

9. Page 253, Equation (6.114): The equation is missing a factor of $\sin \phi$. The correct equation is

$$\frac{d}{dt} (MU) + \rho_s u_s (U - u_s \sin \phi) A = F - \mu N$$

10. Page 280, Problem 6.103, last line: Replace “$U$” with “$U_1$”.

11. Page 284, Problem 6.117, last line: Replace “$\eta = 1 - r/D$” with “$\eta = 1 - r/R$”.


13. Page 446, Problem 9.28, third line: The equation for $h_p$ is incorrect. The correct equation is

$$h_p = 100 \left[ 1 - (Q/400)^2 \right]$$
14. Page 446, Problem 9.29, third and fourth lines: The equations for \( h_{p1} \) and \( h_{p2} \) are incorrect. The correct equations are

\[
h_{p1} = 100 \left(1 - \frac{Q}{400}\right)^2 \quad \text{and} \quad h_{p2} = 100 \left(1 - \frac{Q}{200}\right)^2
\]

15. Page 448, Problem 9.43: Replace “\( D = 10 \) cm,” with “\( D = 70 \) cm” and replace “\( h_p^* = 40 \) m” with “\( h_p^* = 50 \) m”.

16. Page 450, Problem 9.60, second line: Replace “\( h_p = 225 \) ft,” with “\( h_p = 225 \) m”.

17. Page 469, Problem 10.16, last line: Replace “\( \text{ft}^2 \)” with “\( \text{m}^2 \)”.

18. Page 474, Problem 11.35, second line: Replace “\( \phi \)” and “\( \phi = 5^\circ \)” with “\( \theta \)” and “\( \theta = 5^\circ \)”, respectively.

19. Page 548, Problem 10.38, sixth line: Replace “\( \text{ft}^3/\text{sec} \)” with “\( \text{ft}^2/\text{sec} \)”.

20. Page 611, Problems 12.1 and 12.2: Replace “\( 1 \text{ m} = 3 \cdot 10^{10} \) Å” with “\( 1 \text{ m} = 10^{10} \) Å”.


22. Page 673, Problem 13.34, Part (d): Replace “\( \Omega h^2/\nu \)” with “\( fh^2/\nu \)”.

23. Page 674, Problem 13.38, equation just below the first two lines: Replace “\( u_\theta(r,t) \)” with “\( u_\theta(r,0) \)”.

24. Page 753, Problem 14.38, first line: Replace “300 cm/sec” with “30 cm/sec”.

25. Page 759, Problem 14.67, table heading: Replace “\( k_s(\text{Mme}) \)” with “\( k_s(\text{mm}) \)”.

26. Page 801, next to last paragraph: Replace the entire paragraph with the following paragraph.

“Now consider the limiting case of an infinite wedge, i.e., \( L \to \infty \). We pose the question as to what the flowfield must be. In particular, what is the limiting value of \( \beta \) far above the dividing streamline? Clearly, it cannot be a constant value as the required turning through an angle \( \theta > \theta_{\text{max}} \) cannot be accomplished with an oblique linear shock. We denote the shock stand-off distance, which is the distance between the shock and the wedge leading edge, by \( \delta \). Ward and Pugh (1968) show that \( \delta \) varies linearly with \( L \) for a finite cone (aside from having a different \( \theta_{\text{max}} \), flow past a cone is similar to flow past a wedge). Leyva (1999) confirms this in a comprehensive computational/experimental study. Since \( L \) is the only length scale in the flow, and since we also expect the solution to depend on Mach number, \( M \), specific-heat ratio, \( \gamma \), and \( \theta \), then

\[
\delta = L f(M, \gamma, \theta)
\]

where \( f(M, \gamma, \theta) \) is a function that can be determined either by computation or experiment. In the limit \( L \to \infty \), the standoff distance must also become infinite. Thus, the solution for flow past an infinite wedge with \( \theta > \theta_{\text{max}} \) is a shock infinitely far upstream of the wedge. Hida (1954) shows that the shock for an infinite wedge is a normal shock.”
The references are as follows.


27. Page 829, Problem 15.11, second line: Replace “$u = 820$ m/sec” with “$u = 820$ ft/sec”.

28. Page 835, Problem 15.73, third line from bottom: Replace “$Nu_x \equiv q_w x/[k(T_w - T_e)]$” with “$Nu_x \equiv q_w x/[k(T_w - T_e)]$”.

29. Page 845, Table A.9, $\mu_r$ for oxygen: Replace “4.19 $\cdot 10^{-8}$” with “4.19 $\cdot 10^{-7}$”.