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

These are all of the known typographical errors as of July 15, 2010.

1. Page 9, Example 1.3: The units of $\mathcal{R}$ should be J/(kg-mole·K) and those of $\mathcal{M}$ should be kg/(kg-mole). Also, the value of the universal gas constant should be 8314, rather than 8310.

2. Page 10, Example 1.4, next to last sentence: Change "vanes inversely" to "varies inversely".

3. Page 17, Example 1.8: Change "Consider tape whose width" to "Consider tape whose width (out of the page)".

4. Page 23, Problem 1.27: Change "Appealing to Equation (1.4)" to "Appealing to Equation (1.18)".

5. Page 25, Problem 1.48: Change "for is given by" to "is given by".

6. Page 69, Example 3.3, last line: Change "54.138" to "54.127".

7. Page 78, next to last line: Change "CB and OB" to "CB and OD".

8. Page 96, Problem 3.66, first line: Change "$h = \frac{1}{5}h$" to "$h = \frac{1}{5}H$".

9. Page 135, paragraph 2, next to last line: Change "forms to Chapter 6" to "forms in Chapter 6".

10. Page 155, Problem 5.12: Change "A unsteady" to "An unsteady".

11. Page 177, Example 6.3, first line: Delete the first occurrence of the phrase "of cross-sectional area".

12. Page 180, line just above Equation (6.37): Change "cross-sectional area" to "diameter".

13. Page 182, Figure 6.9: Change "u_1" and "u_2" to "U_1" and "U_2", respectively.

14. Page 193, Paragraph just above Equation (6.97), first line: Change "indicated integral" to "indicated integration".

15. Page 205, Problem 6.37, second line: Change "from the lower duct wall" to "from the upper duct wall".

16. Page 220, Problems 6.91 and 6.92, first line below equation: Replace "Assuming fuel density, ρ_e, velocity, u_e, and exit area, A_e, are constant at the rocket exit plane, and that pressure at the rocket exit plane is negligibly small, determine" with "Fuel density, ρ_e, and velocity, u_e, are uniform at the rocket exit plane, which has area A_e. Also, pressure at the rocket exit plane is negligible. Determine".

17. Page 220, Problem 6.92, first line: Replace "Klingons" with "Romulans".

18. Page 241, Figure 7.5, caption: Change "Fiction" to "Friction".

19. Page 254, just above Equation (7.111): Replace "substitute Equations (7.108) and (7.109) into Equation (7.104)" with "combine Equations (7.104), (7.106) and (7.108), and let $d_2/d_1 = \sqrt{2}$". Also, the correct Equation (7.111) for h_L is

$$h_L = \left[\hat{R}_1 + \hat{R}_2 \left(\frac{d_1}{d_2}\right)^4\right] \overline{u}_1^2 = \left[\hat{R}_1 + \frac{1}{4}\hat{R}_2\right] U^2$$

20. Page 262, Example 7.11, last paragraph: Change "0.30 and 0.50" to "0.030 and 0.050".

21. Page 266, next to last paragraph, first line: Change "the pebble advances" to "the point where the pebble strikes advances".

22. Page 267, Example 7.13: The dimensions of y are m, not m/sec. The correct equation for $\overline{u}$ is

$$\overline{u} = \frac{Q}{y^2} = \frac{5 \text{ m}^3/\text{sec}}{(2.61 \text{ m})^2} = 0.734 \frac{\text{m}}{\text{sec}}$$

23. Page 272, Example 7.15, line 1: Change "$Fr_2 = 2$" to "$Fr_1 = 2$".

24. Page 280, Problem 7.47: Add "$L/D = 100$".

25. Page 281, Problem 7.51, figure: Change "$p_0 + \Delta p$" to "$p_a + \Delta p$".

26. Page 342, Equation (9.78): The quantity "r" should not appear in the equation to the right. The correct equation is

$$\frac{d\Omega\tau}{dU} = 2\rho Q \left(V_j - 2U\right)$$

27. Page 362, paragraph 1, line 2: Change "form the pressure" to "from the pressure".

28. Page 369, Problem 10.14, third line below equation: Replace "ft^2/sec^2" with "ft^2/sec".

29. Page 369, Problem 10.15, fourth line below equation (twice): Replace "m^2/sec^2" with "m^2/sec".

30. Page 369, Problem 10.16, last line: Replace "ft^2/sec^2" with "ft^2/sec".

31. Page 369, Problem 10.17, last line: Replace "m^2/sec^2" with "m^2/sec".

32. Page 387, paragraph 4, line 1: Change "one the" to "the one".

33. Page 429, paragraph 1, line 2: Change "$v(0^+, y)$" to "$v(0^-, y)$".

34. Page 441, Problem 11.58: In the last line, change "$U = u_o$" to "$U = U_o$".

35. Page 484, paragraph 2, line 4: Change "number if timesteps" to "number of timesteps".

36. Page 494, Problem 12.52: Change "$u(0) = 0, u'(h/2) = 0$" to "$u(\pm h/2) = 0$".

37. Page 524, Equations (13.158) and (13.159): Change "p_a" to "p_o".

38. Page 524, last line: Change "p_a" to "p_o".

39. Page 526, Equations (13.171) and (13.173): Change "p_a" to "p_o". It appears twice in Equation (13.173).

40. Page 527, Equation (13.174): Change "p_a" to "p_o".

41. Page 529, Equations (13.180) and (13.182): Change "$\Delta t/(4\Delta x)$" to "$U\Delta t/(4\Delta x)$". It appears four times in each equation.

42. Page 529, Equation (13.183): Change "$\Delta t/\Delta x$" to "$U\Delta t/\Delta x$". It appears in both the numerator and the denominator.

43. Page 530, Equation (13.184): Change "$\Delta t/(2\Delta x)$" to "$U\Delta t/(2\Delta x)$". It appears in both the numerator and the denominator.

44. Page 530, Equations (13.187): Change "$\Delta t/(4\Delta x)$" to "$U\Delta t/(4\Delta x)$". It appears in the equations for A_j and C_j.

45. Page 537, Problem 13.20(b): Change "p_a" to "p_o".

46. Page 541, Problem 13.31(c): Change "p_a" to "p_o".

47. Page 544, Problem 13.42: Change "p_a" to "p_o".

48. Page 555, Unnumbered equation in Point 2: Replace "$\partial u/\partial x$" with "$\partial v/\partial x$". The correct equation is
$$u\frac{\partial v}{\partial x} \sim v\frac{\partial v}{\partial y} \sim \nu\frac{\partial^2 v}{\partial y^2} \sim \frac{U^2\delta}{x^2}$$

49. Page 639, last paragraph, last line: Change "$[\boldsymbol{\tau}] = \mathbf{0}$]" to "$[\boldsymbol{\tau}] = [\mathbf{0}]$".

50. Page 684, Problem 15.72, equation: In the first term, replace "$\frac{1}{2}\left(u_{i+1}^n - u_{i-1}^n\right)$" with "$\frac{1}{2}\left(u_{i+1}^n + u_{i-1}^n\right)$". The correct equation is
$$\frac{u_i^{n+1} - \frac{1}{2}\left(u_{i+1}^n + u_{i-1}^n\right)}{\Delta t} + a\,\frac{u_{i+1}^n - u_{i-1}^n}{2\Delta x} = 0$$

51. Page 693, Table B.3: Change "deka" to "deca".

52. Page 718: Equation (E.24): The equation actually defines $-\nabla \times \mathbf{u}$. Also, in the radial direction term, the denominator should have $\sin\phi$ rather than $\sin\theta$. The correct equation is
$$\begin{aligned}
\nabla \times \mathbf{u} &= \frac{\mathbf{e}_R}{R\sin\phi}\left[\frac{\partial}{\partial\phi}\left(u_\theta \sin\phi\right) - \frac{\partial u_\phi}{\partial\theta}\right] \\
&+ \frac{\mathbf{e}_\theta}{R}\left[\frac{\partial}{\partial R}\left(R u_\phi\right) - \frac{\partial u_R}{\partial\phi}\right] \\
&+ \frac{\mathbf{e}_\phi}{R\sin\phi}\left[\frac{\partial u_R}{\partial\theta} - \frac{\partial}{\partial R}(R u_\theta \sin\phi)\right]
\end{aligned}$$

53. Page 718: Equation (E.25): The first term on the second line of the equation should have $R^2 \sin\phi$ in the denominator rather than $R^2 \sin^2\phi$. The correct equation is

$$\begin{aligned}\nabla^2\mathbf{u} &= \left[\frac{1}{R^2}\frac{\partial}{\partial R}\left(R^2\frac{\partial}{\partial R}\right) + \frac{1}{R^2\sin^2\phi}\frac{\partial^2}{\partial\theta^2}\right.\\ &+ \left.\frac{1}{R^2\sin\phi}\frac{\partial}{\partial\phi}\left(\sin\phi\frac{\partial}{\partial\phi}\right)\right](u_R\mathbf{e}_R + u_\theta\mathbf{e}_\theta + u_\phi\mathbf{e}_\phi)\end{aligned}$$

54. Page 759, Problem 1.19: Change the units from "J/(kg-mole·K)" to "J/(kg·K)".

55. Page 762, Problem 7.33: Change "10.16 m" to "13.42 m".

56. Page 762, Problem 7.51: The number "0.42" should be changed to "0.33". The correct answer is

$$\mathbf{R} = \pi\rho U^2 D^2[0.33\,\mathbf{i} - 0.5625\,\mathbf{j}]$$

57. Page 762, Problem 7.71: Froude number is dimensionless. Change "$Fr_1 = 0.034$ ft" to "$Fr_1 = 0.034$".

58. Page 763, Problems 8.21 and 8.23: The numbers are reversed. "8.21" should be "8.23" and "8.23" should be "8.21".

59. Page 763, Problem 8.29: The answer is off by a factor of 10. Change "$T_2 = 1947$ K" to "$T_2 = 194.7$ K".