Errata and other notes
on
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p. 7: Recent studies on the *Hindenburg* (and on internal Zeppelin documents after the accident) suggest that it was actually the highly flammable doping used on the skin of the *Hindenburg* that ignited, not the Hydrogen. See for example http://www.ttcorp.com/nha/advocate/ad22zepp.htm

p. 40: The letter S represents the projected planform wing area, and does not include the area of both upper and lower surfaces as stated. For a rectangular wing with chord c and span b, S = bc.

p. 48: The x in Reynolds number is not the distance from the leading edge of the airfoil. It is a characteristic length for the body, typically taken to be the chord length c for an airfoil.

p. 57, Fig 3.13: The C_D/C_L curve for a symmetric airfoil should have a minimum at $C_L = 0$. As shown, it has a minimum less than zero (implying negative camber).

p. 58: In the discussion of NACA 0012 airfoil, the 12 corresponds to a maximum thickness that is 12% **of** the chord length, not that the maximum thickness occurs **at** the 12% of the way along the chord.

p. 58: Note: The current version of FoilSim is FoilSim II, which is apparently set up differently than when the book was published. Problem 3.10 cannot be done with FoilSim II (it cannot handle a thickness of 38%).

p. 61: Problem 3.6 should refer to Figure 3.4, not 3.3.

p. 70: Flight path angle should not be confused with the pitch angle. Pitch angle is the angle between a line through the aircraft's nose and horizontal. Flight path angle is the angle between the aircraft's velocity vector and horizontal. Also, beware that in the aircraft performance field, γ is the conventional symbol for flight path angle, and θ is the conventional symbol for pitch angle.

p. 76: It is worth reiterating that what directly causes stall is not a slow airspeed, but the need to have a large C_L (and thus large angle of attack) to maintain steady flight at low speed.

p. 77: The max L/D discussion can be taken one step further after Eq. 4.29. That is:

$$\left(\frac{L}{D}\right)_{\max} = \frac{1}{2}\sqrt{\frac{\pi e AR}{C_{D_0}}}$$

this highlights that for max L/D, one wants a high aspect ratio and small parasitic drag coefficient.

p. 80-81: An alternate way to find Range of a jet aircraft is to take Endurance (Eq. 4.45) and multiply by the flight velocity (Range = endurance x velocity). This yields

$$R = \frac{\mathrm{v}}{\mu}\frac{L}{D}\ln(1+\frac{m_f}{m_0})$$

which shows the need to fly at max (vL/D) for a jet. This derivation assumes flying at a constant velocity and L/D over the entire flight. As fuel is burned, the aircraft must then climb (to reduce air density) since the required lift decreases and velocity must be held constant.

p. 82: L/D also directly represents the ratio of the distance flown forward relative to the altitude lost during a glide.

p. 84: Eq. 4.60: This was meant to be $\phi = \arccos(1/n)$ but the *a* was separated from the cos making it look like a different variable. Also, commonly one is interested in load factor as a function of bank angle, which is simply:

$$n = \sec\phi$$

p. 85: Pull-up maneuver. The pilot deflects the elevator, not both ailerons. It also should be noted that the equations here only apply at the moment the maneuver is started. For a given load factor, radius of curvature will change continuously as the aircraft performs a loop because L and W are no longer directly opposite one another.

p. 87: Pushdown maneuver. Same comment regarding deflecting elevator vs. ailerons and for radius of curvature. Also, aircraft can fly loops downwards (called an outside loop). It's just not pleasant due to the negative g-loads and very high speeds involved during the pushover.

p. 96: Equation 5.4 should read:

$$\mathbf{R} = \mathbf{F} + \mathbf{G} = (F_1 + G_1)\hat{i}_1 + (F_2 + G_2)\hat{i}_2 + (F_3 + G_3)\hat{i}_3$$

p. 102: The ● in Figure 5.10 should be an *e*.

p. 154: The 5th sentence of the 3rd paragraph should read "If the *horizontal stabilizer* is inclined downward to produce a negative lift…"

p. 156: The sentence before Eq. 7.9 should read "The coefficients of lift for the wing and for the tail ~~and the angle of attack~~ can be defined as the product of the slope of the *lift coefficient curve* (a_w) *times the angle of attack* (α_w)."

p. 156: Equation 7.11: A_t and A_w are the tail surface planform area and wing planform area, respectively.

p. 156: Second to last sentence: "For lift generation, $\alpha_w > 0$, …"

p. 157: In the example, $a_t = 4$ rad^{-1}.

p. 302: The mass of the helium balloons is closer to 100g. Because the helium is compressed in the balloons, the actual density of helium in the balloons is larger than the value cited. We found a typical balloon would lift 300 – 400 g, which is approximately 80% of the value one would compute using ideal conditions.

p. 324: Table B.3. Density of air is 1.161 kg/m^3 [the 10^{-3} is incorrect]