ERRATA: Airplane Design Part VI

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page 28, Line 3
Should read ‘$\epsilon_i = \text{wing twist angle in radians, positive for wash-in …}'

page 73, Line 23
Should read ‘Figure 4.36 illustrates two possibilities. $\epsilon_n > 0$ for upwash and $\epsilon_n < 0$ for downwash.’

page 88, Figure 4.52
$b_f / b$ should be $b_f / b$.

page 89, Figure 4.53
Add $b_f / b = 0.6$ to bottom graph margin.

page 97, Figure 4.60
Horizontal axis title should read ‘TAKE-OFF WEIGHT $\sim W_{TO}/1,000$’

page 104, Line 25
‘inrecremental’ should be ‘incremental’

page 115, Equation (4.88)
Should read: $C_{f\text{wlam}} = \frac{1.328}{\left(R_{N\text{wlam}}\right)^{1/2}}$

page 115, Equation (4.90)
Should read: $C_{f\text{fuslam}} = \frac{1.328}{\left(R_{N\text{fuslam}}\right)^{1/2}}$

page 146, Line 22
‘form’ should be ‘from’

page 200, Figure 6.38
Vertical axis units should be in 1,000 lb

page 205, Line 9
Should read

‘SHP$_{av}$

$(SHP_{av}\eta_{int/inc} - P_{extr})$

285 248 206 172 140

275 239 198 165 133
\( P_{av} \) 242 210 174 145 117

**page 212, Figure 7.5**
Vertical axis units should be in 1,000 lb

**page 224, Figure 8.9**
‘NACA 63-005’ should be ‘NACA 63-006’

**page 229, Equation (8.7)**
Should read:
\[
\Delta c_l = \eta_1 \left( c_l \delta_1 \right) \left( \delta_1 \right) \left\{ \left( \frac{c + c_l}{c} \right) + \eta_2 \left( c_l \delta_2 \right) \left( \delta_1 + \delta_2 \right) \left( \frac{c'}{c} \right) \right\}
\]

**page 236 Figure 8.26**
Vertical axis values should be negative

**page 239, Equation (8.19)**
Should read: \( \Delta c_{l_{max}} = \left( c_l \delta_{max} \right) \eta_{max} \delta f \eta \left( \frac{c'}{c} \right) \)

**page 259, Line 9**
Should read ‘… leading edge flaps at \( \alpha = 0 \) may be estimated from:

**page 269, Equation (8.37)**
Should read:
\[
\eta_h = 1 - \left\{ \cos^2 \left( \frac{\pi h_{wake}}{2 \Delta z_{wake}} \right) \right\} \left\{ 2.42 \sqrt{C_{Dw}} \left/ \frac{x_{h_{wake}}}{c} \right. + 0.30 \right\}
\]

**page 269, Line 23**
Should read
\[
\text{where: } z_{h_{wake}} = a \sin \left( \gamma_h - \alpha - i_w + \varepsilon_h \right) \quad (8.38a)
\]
\[
x_{h_{wake}} = a \cos \left( \gamma_h - \alpha - i_w + \varepsilon_h \right) \quad (8.38b)
\]

with \( a, \gamma_h, \varepsilon_h, i_w \) and \( \alpha \) shown in Fig. 8.63.’

**page 269, Equation (8.39)**
Should read: \( \varepsilon_h = \varepsilon \left( \frac{d \varepsilon_h}{d \alpha} \right)_{p.off} \alpha \)

**page 269, Equation (8.40)**
\[
\Delta z_{wake} = 0.68 \left\{ \sqrt{C_{Dw}} \left/ \frac{x_{h_{wake}}}{c} \right. + 0.15 \right\}
\]

**page 270, Figure 8.63**
Should be
page 272, Equation (8.48)  Should read: \( K_h = \left( \frac{1 - \frac{h_h}{b}}{\left( \frac{2l_h}{b} \right)^{1/3}} \right) \)

page 273, Figure 8.65c  ‘K_H’ should be ‘K_h’

page 273, Figure 8.65c  \( \frac{2h_H}{b} \) should be \( \frac{2h_h}{b} \)

page 273, Figure 8.65c  \( \frac{2l_H}{b} \) should be \( \frac{2l_h}{b} \)

page 273, Figure 8.65c  ‘K_H' = \left( \frac{1 - \frac{h_H}{b}}{\left( \frac{2l_H}{b} \right)^{1/3}} \right) \) should be ‘K_h' = \left( \frac{1 - \frac{h_h}{b}}{\left( \frac{2l_h}{b} \right)^{1/3}} \right) \)

page 281, Equation (8.55)  Should read:
\[
\Delta \alpha_g = -F_{nw} \left[ \frac{9.12}{A} \right] + 7.16 \left[ \frac{c_f}{b} \right] \left( C_{Lwf} \right) + \\
- \left[ \frac{A}{2C_{L\alpha wf}} \right] \left[ \frac{c_f}{b} \right] \left[ \frac{L}{L_o} \right]^{-1} \left( C_{Lwf} \right) r_g + \\
- \left[ \frac{\delta_f}{50} \right] \left( C_{L\alpha wf} \right) \Delta (\Delta C_L) f
\]

**Page 342, Equation (8.108)**

Should read:

\[
(dC_m/dC_L)_N = \sum_{i=1}^{i=n} \left[ \left( \frac{dC_N}{d\alpha} \right)_{P_i} \left( \frac{d\bar{P}_i}{d\alpha} \right) \left( l_{P_i} \right) \left( \frac{\pi}{4} \right) \left( D_{P_i} \right)^2 \right]
\]

**Page 357, Table 9.1**

Third row, second column ‘0.8’ should be ‘-0.8’

**Page 390, Figure 10.16**

‘\(z_h = \) vertical distance…’ should be ‘\(z_h = \) vertical distance between the horizontal tail aerodynamic center to the fuselage center line’

**Page 398, Equation (10.44)**

Should read:

\[
C_{NT\beta} = -\sum_{i=1}^{i=n} \left[ \left( \frac{dC_N}{d\alpha} \right)_{P_i} \left( \frac{\pi}{4} \right) \left( D_{P_i} \right)^2 \left( l_{P_i} \right) \right] / Sb
\]

**Page 401, Line 19**

Should read ‘where: \(\sigma_{\beta\alpha} \) is the sidewash contribution due to angle of attack, in \(\text{deg}^{-1}\). It is found from Figures 10.30.’

**Page 401, Line 21**

Should read ‘\(\alpha_f \) is the angle of attack of the fuselage, in \(\text{deg}\).’
page 401, Line 22
Should read ‘$\sigma_{\beta}$’ is the sidewash contribution due to wing
dihedral, in deg$^{-1}$. It is found from Figures 10.31.’

page 401, Line 24
Should read ‘$\Gamma$’ is the wing dihedral angle, in deg, as
defined in Figure 10.7.’

page 401, Line 26
Should read ‘$\sigma_{\beta_{\varepsilon}}$’ is the sidewash contribution due to
wing twist, in deg$^{-1}$, as obtained from Figures 10.32.’

page 401, Line 28
Should read ‘$\varepsilon_{t}$’ is the wing twist angle, in deg, as shown
in Figure 10.26.’

page 421, Equation (10.60)
Should read:

$$C_{l_{pv}} = \frac{2}{b_{w}^{2}} \left[ (z_{v} \cos \alpha - l_{v} \sin \alpha) \left[ (z_{v} \cos \alpha - l_{v} \sin \alpha) - (Z_{ac_{v}} - Z_{cg}) \right] \right] C_{y_{\beta_{v}}}$$

page 421, Line 14
Should read ‘where: $z_{v}$ and $l_{v}$ are defined in Figure 10.27’

page 430, Figure 10.42
Vertical axis values should be divided by -4

page 435, Equation (10.89)
Should read: $C_{D_{lh}} = \frac{2C_{L_{o}}}{\pi A_{e}} C_{L_{A_{h}}} \eta_{h} \frac{S_{h}}{S}$

page 435, Line 36
Should read ‘where: $C_{L_{o}}$ is the airplane zero-angle-of-
attack lift coefficient follows from Eqn. (10.90).’

page 436, Equation (10.90)
Should read:

$$C_{L_{o}} = C_{L_{lw}} + C_{L_{A_{h}}} \eta_{h} (S_{h}/S) \left( -\alpha_{o_{L_{h}}} - \varepsilon_{o_{h}} \right) +$$

$$+ C_{L_{A_{c}}} \eta_{c} (S_{c}/S) \left( -\alpha_{o_{L_{c}}} - \varepsilon_{o_{c}} \right)$$

page 436, Line 3-7
Remove Line 3-7

page 439, Equation (10.97)
Should read: $C_{D_{lc}} = \frac{2C_{L_{o}}}{\pi A_{e}} C_{L_{A_{c}}} \eta_{c} \frac{S_{c}}{S}$

page 439, Line 5
Should read ‘where: $C_{L_{o}}$ is the airplane zero-angle-of-
attack lift coefficient follows from Eqn. (10.98).’
page 439, Equation (10.98)  
Should read:
\[
C_{L_o} = C_{L_{owf}} + C_{L_{\alpha_h}} \eta_h \left( \frac{S_h}{S} \right) \left( -\alpha_{oL_h} - \epsilon_{o_h} \right) + \\
+ C_{L_{\alpha_c}} \eta_c \left( \frac{S_c}{S} \right) \left( -\alpha_{oL_c} - \epsilon_{o_c} \right)
\]

page 439, Line 8-12  
Remove Line 8-12

page 461, Line 10  
Following Line 10, should read ‘For single vertical tail:

\[
C_{y\delta_r} = K_b C_{L_{\alpha_v}} \frac{S_v}{S} \left( \frac{c_{l\delta}}{(c_{l\delta})_{\text{theory}}} \right) \left( \frac{k'}{c_{l\alpha_v}} \right) \left( \frac{(\alpha_{\delta})_{cL}}{(\alpha_{\delta})_{cl}} \right) \eta_v \quad (10.123a)
\]

page 461, Line 19  
Following Line 19, should read ‘For twin vertical tail:

\[
C_{y\delta_r} = 2 \left( \frac{C_{\gamma\beta_{v(wfh)}}}{C_{\gamma\beta_{v(\text{eff})}}} \right) K_b C_{L_{\alpha_v}} \frac{S_v}{S} \left( \frac{c_{l\delta}}{(c_{l\delta})_{\text{theory}}} \right) \left( \frac{k'}{c_{l\alpha_v}} \right) \left( \frac{(\alpha_{\delta})_{cL}}{(\alpha_{\delta})_{cl}} \right) \eta_v \quad (10.123b)
\]

Where: \( \frac{C_{\gamma\beta_{v(wfh)}}}{C_{\gamma\beta_{v(\text{eff})}}} \) is found from Figure 10.17’

page 486, Equation (10.149)  
Should read: \( (c^T_{h\delta})_{\alpha,\delta_t} = ... \)

page 509, Line 20  
Should read ‘Note: These books are all published by: Design, Analysis and Research Corporation, 1440 Wakarusa Drive, Suite 500, Lawrence, KS, 66049. Tel. (785) 832-0434’