Errata for *Introduction to Structural Dynamics and Aeroelasticity*
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Errors in first printing corrected in second printing

Page	Description
1	The text states that Langley's 1903 crash was caused by "insufficient torsional stiffness." According to Prof. T. A. Weisshaar's class notes, *Fundamentals of Static and Dynamic Aeroelasticity*, 1992, "Recent tests performed on the original Langley *Aerodrome* by Reed, Doggett and Ricketts, of the NASA/Langley Research Center in Hampton, Virginia, cast suspicion on this speculation that an aeroelastic *instability* caused the *Aerodrome* crash [1.2]. These modern-day tests found an effective shear center very close to the aerodynamic center. While excessive deformation may have caused the failure, it seems unlikely that the wing failed as the result of aeroelastic divergence. However, because of the flexibility of the *Aerodrome*, aeroelastic effects, such as an overload on the wing due to the flexibility, certainly caused the failure." [1.2] I.E. Garrick and W.H. Reed, III, "Historical Development of Aircraft Flutter," *Journal of Aircraft*, Vol. 18, No. 11, November 1981 (AIAA Paper No. 81-0591-CP).
3	Last sentence of paragraph starting with "All the above…" should read: "…the homogeneous equations and boundary conditions associated with a stable configuration have no nontrivial solution."
46	Last item of the bulleted list, where it presently says "shear and slope" should read "slope and shear" instead.
65	Add sentence after Eq. (2.301): Since the chosen admissible functions have non-zero third derivatives at the tip, they offer the possibility of satisfying the non-zero shear condition in combination with each other. Such admissible functions are called *quasi-comparison* functions.
66	Replace next to last sentence in paragraph at top of page with: "Unlike the problem being solved (and the polynomials chosen), the beam mode shapes are constrained to have zero shear force at the free end and are thus not quasi-comparison functions for the problem with a tip mass."
72	In problem 7, part d, the last sentence should read: "Note that $\alpha_1 l$ versus ζ is the same thing...."
73	In problem 8, part d should read: "Show that, for a uniform beam with ϕ_i as given in the text,…."
78	In problems 20 and 21, the polynomial functions should be $\left(x/\ell\right)^{i+1}$ in order to easily cast the problem in non-dimensional form.
78, 79	In Tables 2.14 and 2.15, x^{i+1} should be replaced by $\left(x/\ell\right)^{i+1}$
79	Figure 2.45 should look like the one below.
81	The label for angle of attack, α, is missing in Figure 3.2.

86 The sentence following Eq. (3.23) should read, “It is evident for this problem as specified that when the aerodynamic center is in front of the mid-chord (as it is in subsonic flow)….”

95 The text just prior to Eq. (3.69) should read “…that expresses N in terms of α_r, given by”

The last sentence of the next to last paragraph should read: “From this, the torsional and bending moment distributions along the wing can be found, leading directly to the maximum stress in the wing, generally somewhere in the root cross section.”

100 Just before Eq. (3.83), the variable η should be defined as $\eta = \bar{y} / \ell$

106 Eqs. (3.99) and (3.100) and the text in between should be written as

$$\begin{aligned} &\bar{\theta}'' - \frac{K}{GJ} w''' + \frac{qeca}{GJ} \theta \cos(\Lambda) = 0 \\ &w'''' - \frac{K}{EI} \bar{\theta}''' - \frac{qca}{EI} \theta \cos(\Lambda) = 0 \end{aligned} \tag{3.99}$$

Differentiating the first equation with respect to $\bar{y}$ and transforming the set of equations so that they are uncoupled in the highest derivative terms $\bar{\theta}'''$ and w'''', we obtain

$$\begin{aligned} &\bar{\theta}''' + \frac{EI\ GJ}{EI\ GJ - K^2} \frac{qeca}{GJ} \theta' \cos(\Lambda) - \frac{K\ \ EI}{EI\ GJ - K^2} \frac{qca}{EI} \theta \cos(\Lambda) = 0 \\ &w'''' + \frac{K\ GJ}{EI\ GJ - K^2} \frac{qeca}{GJ} \theta' \cos(\Lambda) - \frac{EI\ GJ}{EI\ GJ - K^2} \frac{qca}{EI} \theta \cos(\Lambda) = 0 \end{aligned} \tag{3.100}$$

110 Problem 5 should end with, “…spring constant by k_2 and assuming that the aerodynamic center is at the quarter chord, show that divergence can be eliminated if $k_1 / k_2 \geq 3$.”

112 Problem 14 should read “…{ξ} is the column matrix of all unknowns $\bar{\eta}_i = \eta_i / \ell, \ldots$”

113 Problem 17 should read “Using the approximate formula found in Eq. (3.107), determine the divergence dynamic pressure for swept, composite wings when $e < 0$. Discuss the situations in which one might encounter a negative value of e. What sign of κ would you expect to be stabilizing in this case? Plot the divergence dynamic pressure for a swept composite wing with GJ/EI=0.2 and e/ℓ=-.025 versus κ=0 and$\pm$0.4 for varying Λ.”

119 The unit vectors in Fig. 4.2 should have carets over them (i.e., $\hat{\mathbf{b}}_1, \hat{\mathbf{b}}_2, \hat{\mathbf{i}}_1, \hat{\mathbf{i}}_2$).

133 There is a right square bracket] missing from Eq. (4.67) just before the large right square bracket $\Big]$.

There is a right square bracket] missing from Eqs. (4.69) and (4.72) just before the right $\Big|$.

134 There is a right square bracket] missing from Eq. (4.75) just before the right |.

140 The sentence starting on the third line from the top should read, "Thus, the local inertial wind velocity is written approximately as $-U\hat{\mathbf{i}}_1 - \lambda_0\hat{\mathbf{b}}_2$, where λ_0 is the average induced flow (positive as downwash normal to the airfoil zero-lift line)."
Eq. (4.84) should read

$$\begin{aligned} W\hat{\mathbf{a}}_1 &= \mathbf{v}_T - \left(-U\hat{\mathbf{i}}_1 - \lambda_0\hat{\mathbf{b}}_2\right) \\ &= \mathbf{v}_T + U\hat{\mathbf{i}}_1 + \lambda_0\hat{\mathbf{b}}_2 \end{aligned}$$

Eq. (4.90) should read

$$W\hat{\mathbf{a}}_1 = U\hat{\mathbf{i}}_1 - \dot{h}\hat{\mathbf{i}}_2 + \left[b\dot{\theta}\left(a-\frac{1}{2}\right)+\lambda_0\right]\hat{\mathbf{b}}_2$$

Finally, the second of Eqs. (4.93) should read

$$W\hat{\mathbf{a}}_1 \cdot \hat{\mathbf{b}}_2 = -U\sin(\theta) - \dot{h}\cos(\theta) + b\dot{\theta}\left(a-\frac{1}{2}\right)+\lambda_0$$

142 The left hand side of Eq. (4.101) should be d_n not b_n.

153 The answer to Problem 11 should be

$$\begin{bmatrix} p^2+\dfrac{\sigma^2}{V^2}-\dfrac{k^2}{\mu}+\dfrac{2ikC(k)}{\mu} & \dfrac{p^2\mu x_\theta + k(i+ak)+[2+ik(1-2a)]C(k)}{\mu} \\ \dfrac{p^2\mu x_\theta + ak^2 - ik(1+2a)C(k)}{\mu} & r^2\left(p^2+\dfrac{1}{V^2}\right)+\dfrac{4i(1+2a)[2i-k(1-2a)]C(k)-k[k-4i+8a(i+ak)]}{8\mu} \end{bmatrix}$$

154 Figures 4.19 and 4.20 should be as below.

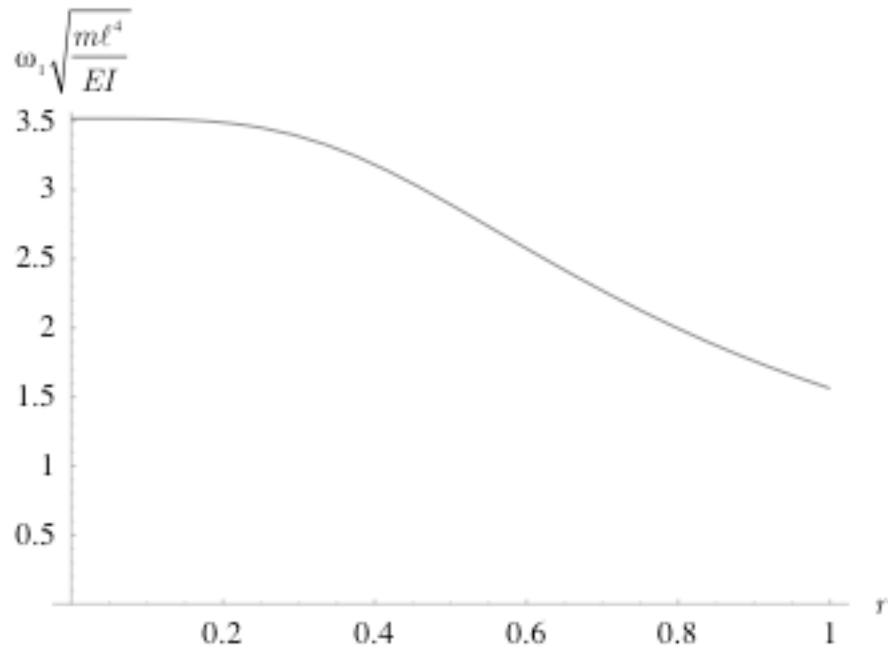

Figure 2.45

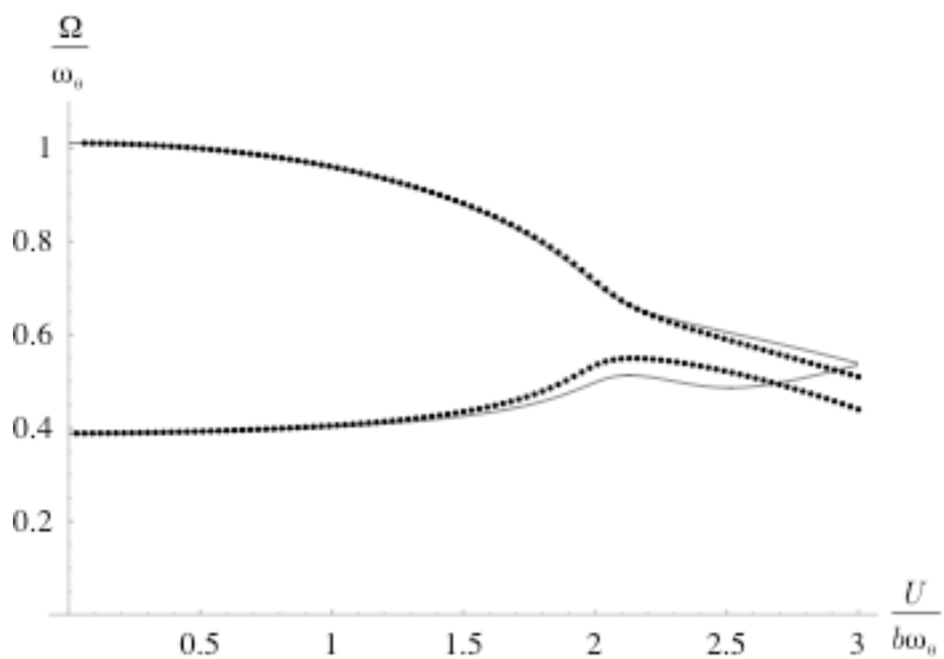

Figure 4.19

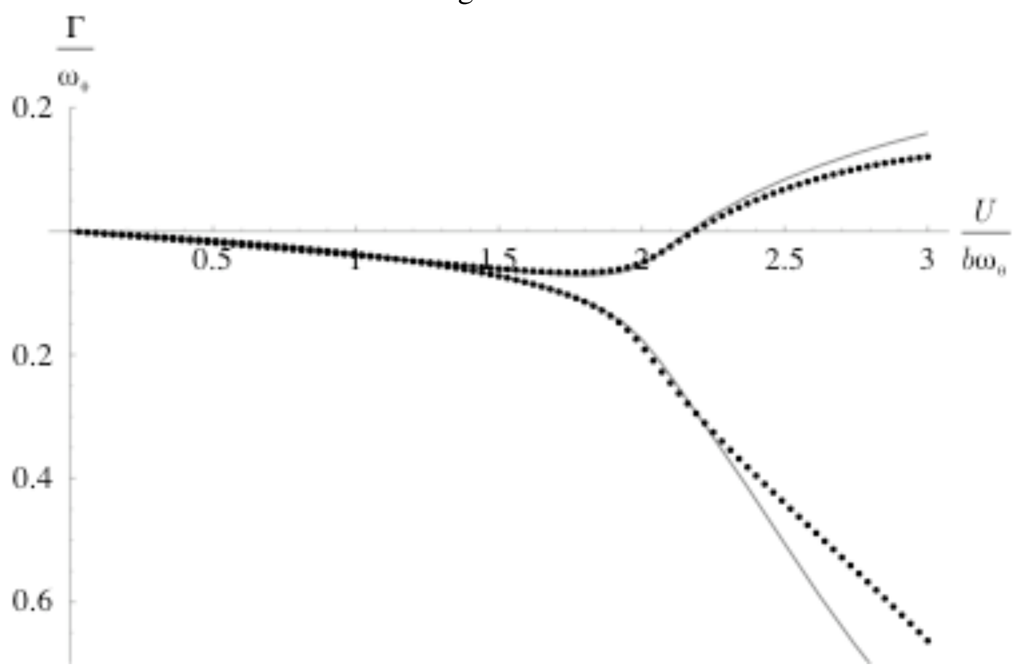

Figure 4.20