Errata for
Introduction to Structural Dynamics and Aeroelasticity

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Second Printing

Note: These errors in have been corrected in the third printing.

Page Description

57 Eq. (2.271) should read:

$$\begin{aligned}\phi_i(x) =& \frac{X_i(x)}{E_{3i}} \\ =& \cos(\alpha_i x) + \cosh(\alpha_i x) - \beta_i \left[\sin(\alpha_i x) + \sinh(\alpha_i x)\right]\end{aligned}$$

57 The text right after Eq. (2.271) should read: "The numerical value of the modal parameter $\beta_i = -E_{1i}/E_{3i}$, also tabulated in Table 2.2, can be obtained from either of the boundary conditions given above as Eqs. (2.267). Using the first of those equations as an example, one obtains"

57 Eq. (2.272) should read:

$$\beta_i = -\frac{E_{1i}}{E_{3i}} = \frac{\cosh(\alpha_i \ell) - \cos(\alpha_i \ell)}{\sinh(\alpha_i \ell) - \sin(\alpha_i \ell)}$$

57 The text right after Eq. (2.272) should read: "It can be shown that the second of Eqs. (2.267) would yield. . . ."

87 Figure 3.10 has the trailing-edge flap rotation shown in the wrong direction. The corrected figure is shown here as Fig. 1.

100 Just before Eq. (3.83), the variable η should be defined as $\eta = \overline{y}/\ell$, not y/ℓ.

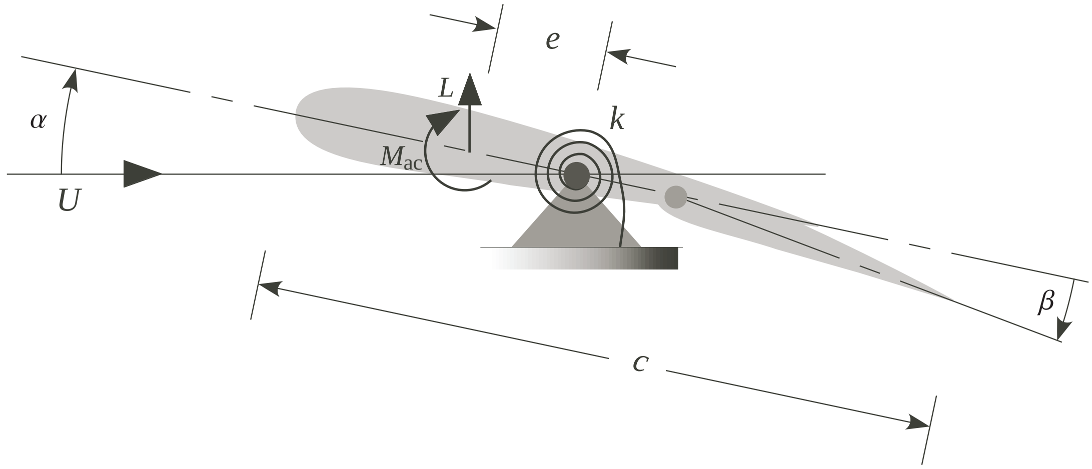

Figure 1: Schematic of the airfoil section of a flapped two-dimensional wing in a wind tunnel

106 Insert the following paragraph immediately after Eq. (3.98): For composite beams the offsets d and e may be defined in a manner similar to the way they were defined for isotropic beams: d is the distance from the $\overline{y}$-axis to the cross-sectional mass centroid, positive when the mass centroid is toward the leading edge from the $\overline{y}$-axis; and e is the distance from the $\overline{y}$-axis to the aerodynamic center, positive when the aerodynamic center is toward the leading edge from the $\overline{y}$-axis. However, for composite beams the $\overline{y}$-axis must have different properties from those it possesses for isotropic beams, and the term "elastic axis" has a different meaning. Recall that for a spanwise uniform isotropic beam, the elastic axis is along the $\overline{y}$-axis and is the locus of cross-sectional shear centers; transverse forces acting through this axis do not twist the beam. For spanwise uniform composite beams with bending-twist coupling no axis can be defined as the locus of a cross-sectional property through which transverse shear forces can act without twisting the beam. For such beams we must place the $\overline{y}$-axis along the locus of generalized shear centers, a point in the cross-section at which transverse shear forces are structurally decoupled from the twisting moment. Although transverse shear forces acting at the $\overline{y}$-axis do not *directly* induce twist, the bending moment induced by the shear force will still induce twist when $K \neq 0$.

116 The last line of Eqs. (4.6) should be

$$= \rho_\infty \frac{U^2}{b^2} \sum_{j=0}^{n} \left(a_{ij}\xi_j + \frac{b}{U} b_{ij}\dot{\xi}_j + \frac{b^2}{U^2} c_{ij}\ddot{\xi}_j \right)$$

117 The first sentence after Eqs. (4.6) should read, "Following the convention in some published work, we have factored out the freestream air density ρ_∞ and U^2/b^2 from the aerodynamic generalized force expression."

117 The fourth sentence after Eqs. (4.6) should end, "…to have the same units and is convenient for nondimensionalization later."

117 Eq. (4.7) should read

$$\frac{b^2}{U^2}\left(M_i\ddot{\xi}_i + M_i\omega_i^2\xi_i\right) - \rho_\infty\frac{b^2}{U^2}\sum_{j=0}^{n} c_{ij}\ddot{\xi}_j - \rho_\infty\frac{b}{U}\sum_{j=0}^{n} b_{ij}\dot{\xi}_j$$
$$- \rho_\infty\sum_{j=0}^{n} a_{ij}\xi_j = 0 \qquad (i = 0, 1, \ldots, n)$$

117 Eq. (4.9) should read

$$\frac{b^2}{U^2}M_i\left(\nu^2 + \omega_i^2\right)\overline{\xi}_i - \rho_\infty\sum_{j=0}^{n}\left(\frac{b^2\nu^2}{U^2}c_{ij} + \frac{b\nu}{U}b_{ij} + a_{ij}\right)\overline{\xi}_j = 0 \quad (i = 0, 1, \ldots, n)$$

123 Figs. 4.3 and 4.4 should be as shown in Fig. 2 and 3.

142 Fig. 4.11 should be as shown in Fig. 4.

143 Fig. 4.12 should be as shown in Fig. 5.

146 The two places where $\overline{\theta}$ occurs in Eq. (4.124) should both be $\overline{\phi}_1$ instead.

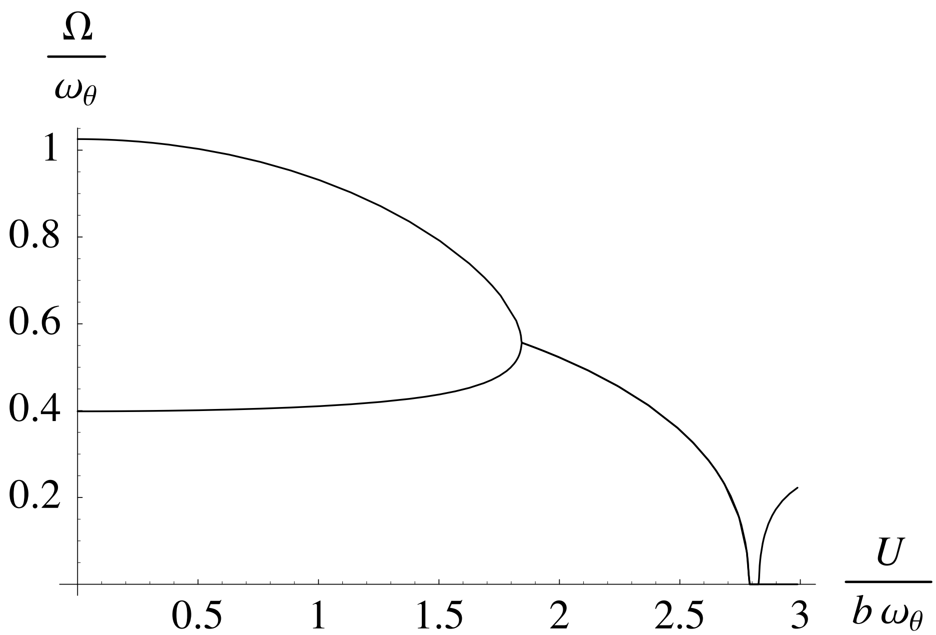

Figure 2: Plot of the modal frequency versus V for $a = -1/5$, $e = -1/10$, $\mu = 20$, $r^2 = 6/25$, and $\sigma = 2/5$ (steady-flow theory)

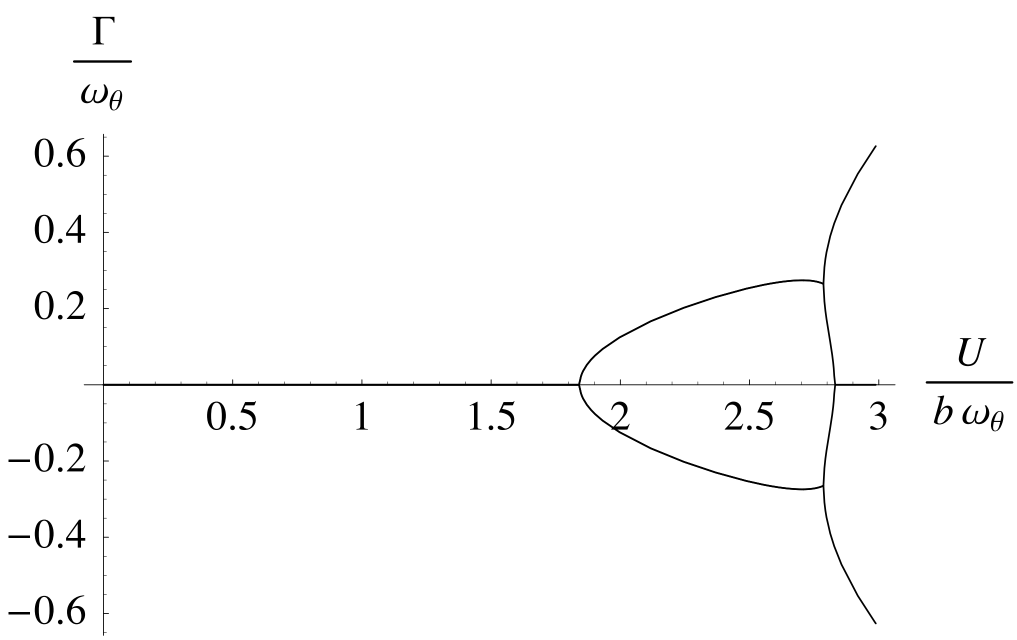

Figure 3: Plot of the modal damping versus V for $a = -1/5$, $e = -1/10$, $\mu = 20$, $r^2 = 6/25$, and $\sigma = 2/5$ (steady-flow theory)

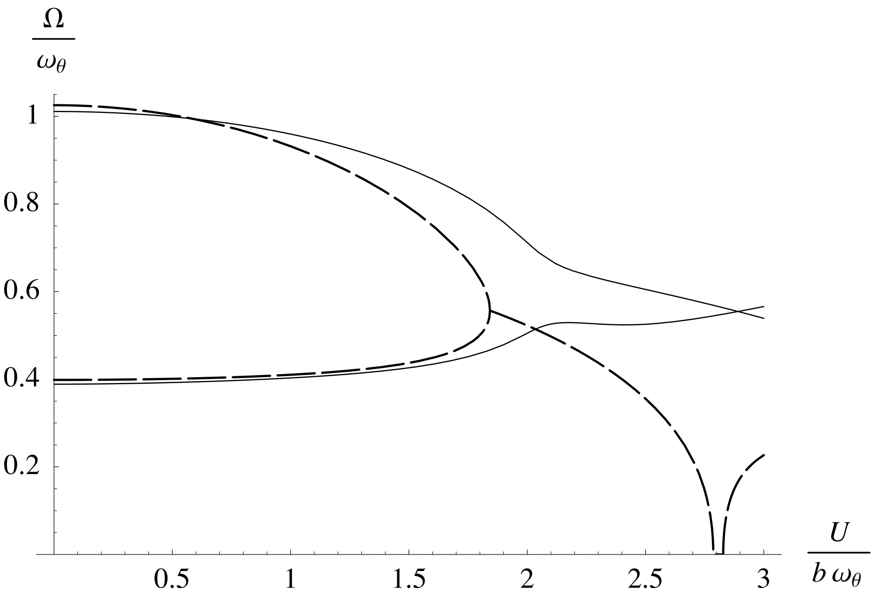

Figure 4: Plot of the modal frequency versus $U/(b\omega_\theta)$ for $a = -1/5$, $e = -1/10$, $\mu = 20$, $r^2 = 6/25$, and $\sigma = 2/5$; solid lines: p method, aerodynamics of Peters et al.; dashed lines: steady flow aerodynamics

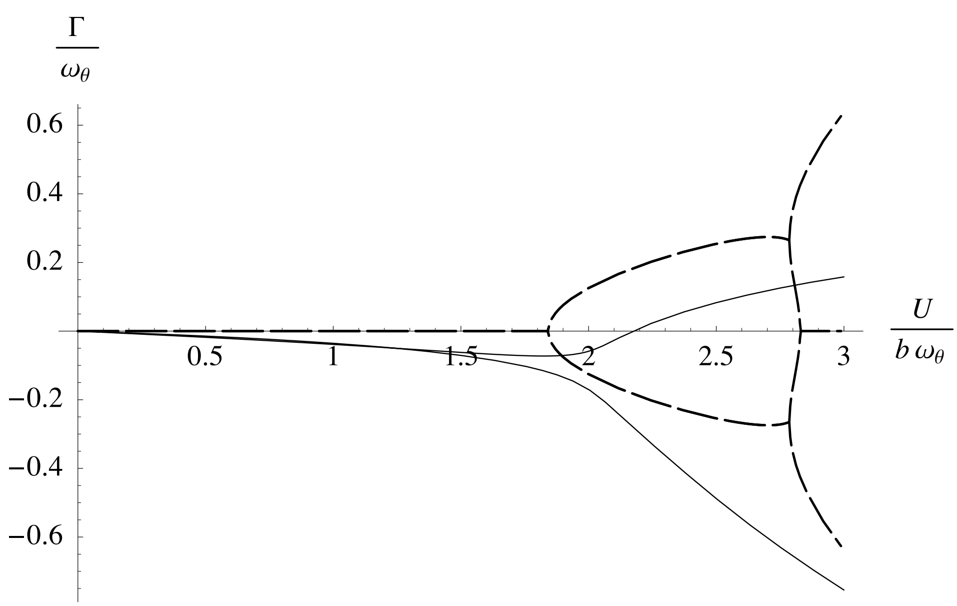

Figure 5: Plot of the modal damping versus $U/(b\omega_\theta)$ for $a = -1/5$, $e = -1/10$, $\mu = 20$, $r^2 = 6/25$, and $\sigma = 2/5$; solid lines: p method, aerodynamics of Peters et al.; dashed lines: steady flow aerodynamics