

Mechanical Vibration: Analysis, Uncertainties, and Control
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ERRATA

p.x: Web site for Matlab primer is incorrect. It should be:
<http://www.crcpress.com/product/isbn/9781420080568>

p.15: Figure 1.7c. The words “Suspension system” belong with the upper spring/damper. In their place, they should be replaced with the words “Tire stiffness & damping”.

p.64: In Figure 2.6, l should be replaced by L .

p.99: After “Therefore, the period of oscillation is” should be
 $T = 2(t_1 + t_2) = 2(0.175 + 0.0658) = 2(0.241) = 0.482$ s

p.101: In Equation 2.31 there is a missing subscript. It should be $x_p(t)$ in the numerator on the left.

p.147: In the equation for natural frequency (the second equation), it should be K (not k).

p155: In Figure 2.65 the direction of the force should be reversed.

p.186: Fig 3.16: The spiral continues to the origin for $\zeta = 0.1$

p.186: In the equation for the signum function it should be if \dot{x} (xdot, not x) is $<$, $=$, and $>$ 0.

p.202: In the equation above Section 3.5.2, the right-hand side is missing the factor ka . (The right-hand side should be $\frac{kaA}{l} \sin \omega t$.)

p.203: The definition of the frequency response function in Equation 3.32 is not correct. It should be $H(i\omega) = \frac{X(i\omega)}{A/k}$.

p.204: In Equation 3.33 it should be A/k not A . In Equation 3.34 the numerator should be 1 not $1/k$. (This makes Equation 3.34 exactly β .)

p.226: The equations for $x_s(t)$ should be

$$\begin{aligned} x_s(t) &= \frac{a_0}{2} + \sum_{p=1}^{\infty} x_p(t) \\ &= \frac{a_0}{2} + \sum_{p=1}^{\infty} A_p \left[a_p \cos(p\omega_r t - \theta_p) + b_p \sin(p\omega_r t - \theta_p) \right] \end{aligned}$$

p.232: In Problem 5 the first word should be “A” not “An”.

p.237: In each part of Problem 15 “ $F(t)$ ” should be “ $F(t)/m$ ”.

p.238: In Problem 20 the numerator should be “1” not “ $1/k$ ”.

p.240: The last sentence in Problem 26 should end: “with $\pm 1\%$ accuracy error.”

p.261: The second word of the first paragraph should be “name” not “named”.

p.271: In Example 4.4 the problem statement is accidentally repeated in the Solution with a new equation number and footnote.

p.294: In the line after Equation 4.34, the equation “ $\tau = 1/(\zeta\omega)$ ” should be replaced with “ $\tau = 1/(\delta f)$ where δ is the log decrement and f is the frequency in Hertz.”

p.296: In the second paragraph, the phrase “we can substitute the expression for $x(t)$ ” should be replaced by “we can substitute the second derivative of $x(t)$ ”.

p.459: The second equation should not have dots before the unit vectors.

p.479: In Example 7.6, there are missing commas in the first two equations. It should be $q_1 = l - r$, $q_2 = r$ and then below it $\dot{q}_1 = -\dot{r}$, $\dot{q}_2 = \dot{r}$

p.481: In the last sentence the phrase “power two and higher” should be “power three and higher”.

p.493: In Problem 2 the equation of motion shown is not correct. It should be:

$$m(a^2 + 4l^2 \cos^2 \theta)\ddot{\theta} - 2ml^2\dot{\theta}^2 \sin 2\theta + mg(5a + 4b) \cos \theta + \frac{1}{2}ka^2 \sin 2\theta = 0.$$

p.494: In Problem 3 the equation of motion shown is not correct. It should be:

$$\left(m(l+r)^2 + \frac{2}{5}mr^2 \right) \ddot{\theta} + ka^2 \sin \theta \cos \theta - mg(l+r) \cos \theta = 0$$

where l is the length of the rod. This length is not drawn correctly in the figure. (It should be drawn to the left edge of the sphere, not to its center.)

p.495: In Figure 7.15 the grounding symbol should not be used since it is not an inertial ground. The top line should be shown without any grounding symbol.

p.495: In Problem 11 it should be “Formulate the equations of motion” rather than “equation of motion”.

p.496: In Figure 7.16 the grounding symbol should not be used since it is not an inertial ground. The top line should be shown without any grounding symbol.

p.510: In the solution to Example 8.2, $P_2 = -k_2x_1$ in the first set of equations.

p.535: An equal sign is missing in last equation. It should be $m_3 = \frac{W_{car} + W_{cable}}{g} = \frac{1250\text{lb}}{g}$

p.539: Near the bottom of the page there are missing units with f . It should be $f_1 = 1\text{ N}, f_2 = 0\text{ N}$

p.541: In the second line delete the word “dimensionless”. (The squares of the natural frequencies have units.)

p.550: In Footnote 28 the equation should be $\theta(t) = A \cos(\omega t - \phi)$.

p.558: In the last sentence of the paragraph before Equation 8.60 it should state: “Similarly we can rewrite the last two terms in Equation 8.59 by following a similar procedure for the complex conjugate pairs. For $x_1(t)$, the ratios r_{11} and ...”

p.581: All equations should have = signs, i.e., in two places replace \approx by =.

p.596: In Figure 8.41 the grounding symbol should not be used since it is not an inertial ground. The earth should be shown shaded without the grounding symbol.

p.597: In Problem 12, it should refer to the system of Figure 8.12.

p.599: In Problem 18 the second equation of motion has two errors: (1) the term $(I_0 + \frac{L}{2})\ddot{\theta}$ should be $(I_0 + \frac{mL^2}{4})\ddot{\theta}$ and (2) the term $mg \frac{L}{2} \sin \theta$ should just be $mg \frac{L}{2} \theta$.

p.604: In Prob. 37, in the two forces, replace ω_1 by Ω_1 and ω_2 by Ω_2 in order to distinguish between forcing frequencies and natural frequencies.

p.668: In the caption for Figure 9.23 it should be $B = 0.74(g/V)^4$.

p.669: In Problem 2 the rotation in the system is unrestrained. The figure is not clear at the boundaries.

p.705: The normalized modes ($\hat{U}_j(x)$) should be used (in place of $U_j(x)$) in several places, including in Equations 10.43 and 10.44, right before the unnumbered equation ($m\hat{U}_k(x)$), in the unnumbered equation (three places: $\hat{U}_k(x)$ to the left, $\hat{U}_j(x)\hat{U}_k(x)$ to the right), and in

the sentence right after the unnumbered equation ($\hat{U}_j(x)$). No change is needed in the sentence beginning with: "We normalize Equation 10.42 for $U_j(x)$ via ..."

In Equation 10.46 there is no j subscript in the derivative.

p.758: In the last sentence of Problem 3, it should ask for the value of the tension, not the value of ω_1 . Also, $m = 5$ kg/m (not ρ).

p.759: In Problem 6, the beam is fixed-fixed, not cantilever.

p.768: In Problem 42 the length is not provided. It should be $L = 1000$ in. In Problem 45, it should be Equation 10.124.

p.929: In Equation A.14, in the Taylor expansion, $\sin a$ should be replaced by $\sin \theta_0$.

p.930: The reference to "Table 1.1" in the second to last paragraph should be "Table A.1".

Last updated: Aug 6, 2010