Foundations of Vibroacoustics
Errata and Clarifications

October 12, 2025

p27, Third line under heading 1.4.11, change Equation (1.38) to Equation (1.54).

p27, Fourth line under heading 1.4.11, change Equation (1.38) to Equation (1.54).

p80, Figure 2.11, change M_{xy} to $M_{x\theta}$.

p80, In Equation (2.66) and in the line immediately after, change J to J_x.

p80, In Equations (2.66), (2.67) and (2.68) change M_{xy} to $M_{x\theta}$.

p80, lines immediately after Equations (2.66) and (2.67), change M_{xy} to $M_{x\theta}$.

p81, In Equation (2.69) change M_{xy} to $M_{x\theta}$.

p81, In Equations (2.70), (2.71) and (2.72) change J to J_x.

p81, In Equations (2.72), (2.73) and (2.74) change c_s to c_T.

p81, 2 lines above Equation (2.74) change c_s to c_T.

p83, In Equations (2.79) and (2.80) change J to J_y.

p83, Second and third lines following Equation (2.79) change J to J_y.

p83, Second line following Equation (2.79) change “transverse axis in the neutral plane” to “y-axis, which is the axis normal to the plane defined by the $x - z$ axes in Figure 2.13”.

p84, In Equations (2.87), (2.88) and (2.90) change J to J_y.

p85, Table 2.2 caption and column 3 header, change J_x to J_y.

p85, Table 2.2, in all figures in column 1, change y to z and x to y.

p86, In Figure 2.15, change $\bar{y}$ to $\bar{z}$.

p86, In Equation (2.92), change y to z.

p86, In Equation (2.93), change $\bar{y}$ to $\bar{z}$ and y to z.

p86, In Equation (2.94), change $\bar{y}$ to $\bar{z}$ and y to z.

p86, In Equations (2.95), (2.97) and (2.98) change J to J_y.

p87, In Equations (2.102) and (2.103) change J to J_y.

p88, In Equations (2.105), (2.107), (2.108), (2.111) and (2.113) change J to J_y.

p89, In Equations (2.116) and (2.123) change J to J_y.

p90, In Equations (2.128) and (2.132) and in the line immediately above Equation (2.132), change J to J_y.

p91, In Equations (2.138) and (2.139) change J to J_y.

p91, 4 lines after Equation (2.139), change "J_{yy} is used and vice versa" to "J_y is used and for motion in the y-direction, J_z is used.

p92, Table 2.3 column 3, change J to J_y in 5 places.

p93, In Equation (2.142) change J to J_y.

p101, Line following Equation (2.184), add "and the units of M_x, M_y and M_{xy} are moment per unit length".

p104, In equation (2.214) delete the "2" multiplier on the RHS.

p104, In equations (2.214) and (2.215), change $\sqrt{\dfrac{D}{\rho_m}}$ to $\sqrt{\dfrac{D}{\rho_m h}}$.

p105, Table 2.8, change $\sqrt{\dfrac{D}{\rho_m}}$ to $\sqrt{\dfrac{D}{\rho_m h}}$ in 4 places.

p106, Table 2.10 caption, change "$n-1$" to "n" and change "$m-1$" to "m".

p106, captions for Tables 2.9 and 2.10, change $\sqrt{\dfrac{D}{\rho_m}}$ to $\sqrt{\dfrac{D}{\rho_m h}}$ in 4 places.

p163, In Equations (4.29) and (4.30), change J to J_y.

p163, 2 lines below Equation (4.29), change J to J_y.

p164, In Equations (4.33) (4.34), (4.35), (4.38) and (4.39), change J to J_y.

p165, In Equation (4.40), change J to J_y.

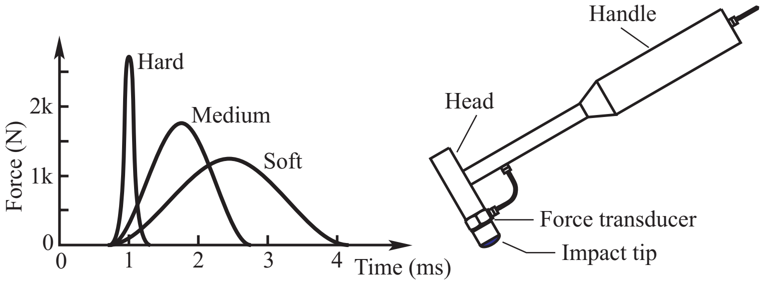
p165, In Table 4.1, column 4, change J to J_x.

p167, replace the 3rd, 4th and 5th lines beneath Table 4.2 with "J_x = polar second moment of area of the beam cross section about the longitudinal x-axis".

p167, last line, change ”$a =$” to ”$2a =$”.

p167, 12th and 13th lines beneath Table 4.2, change J to J_y.

p245, Figure 5.4 is incorrect. It should be as below.



(a) (b)

p273, Equation (6.14), on the far left hand side, remove “$E_s =$”.

p275, In the caption of Table 6.1, change Z_s to Z_A and add the following. For acoustic systems, the real part of the acoustic power input, Π_{in}, can be expressed as, $\Pi_{\text{in}} = \dfrac{< p^2 >}{\text{Re}\{Z_A\}}$.

p275, Table 6.1, column header, change Z_s to Z_A.

p276, Equation (6.21), should be $\langle \text{Re}\{Z_F\} \rangle_{S,\Delta} = \dfrac{2m}{\pi n(\omega)}$.

p276, Equation (6.22), should be $\langle \text{Re}\{Z_A\} \rangle_{S,\Delta} = \dfrac{\rho c^2 n(\omega)}{8\pi V}$, where V is the volume of the space.

p277, Table 6.2, change the equation for c_T to $c_T = c_g = \sqrt{\dfrac{GJ'}{\rho_m J_x}}$.

p277, 8th line under Table 6.2, change J to J_y and add two new definitions.

J_x is the polar second moment of area of the beam cross-section about the longitudinal x-axis.

J' is the torsion constant for the beam cross-section (equal to the polar second moment of area, J_x, for circular-section beams).

p277, Table 6.2, bottom equation, replace ρ with ρ_m.

p278, Table 6.3, top equation, remove "$= c_g$" and after the equation, add another equation as follows: $c_g = 2c_B = \sqrt{\dfrac{2c_L h\omega}{\sqrt{3}}}$.

p278, Table 6.3, following the equation for in-plane compressional modes add:

$$c_L = c_g = \sqrt{\frac{E}{\rho_m(1-\nu^2)}}.$$

p286, line above equation (6.50), replace (6.48) with (6.47).

p286, Equation (6.53), replace π with 2.
p319, beginning with the second paragraph, replace the remainder of Section 7.3.15 with the following:

"If the two functions in the time domain are represented by sampled data, $x[n],\ n = 0, 1, 2,\ \ldots,\ (N-1)$ and $h[m],\ m = 0, 1, 2,\ \ldots,\ (M-1)$, such as obtained by a digital data acquisition system, the output of the **convolution**, $y[k], k = 0, 1, 2,\ \ldots,\ (N + M - 3)$, of the two signals at sample number, k, is given by:

$$y[k] = x[k] * h[k] = h[k] * x[k] = \sum_{n=0}^{N-1} x[n]h[k-n] \tag{1}$$

where terms in the sum are ignored if $[k-n]$ lies outside the range from 0 to $(M-1)$. As can be seen from the equation, each sample in the input signal contributes to many samples in the output signal.

Deconvolution is the process of obtaining a system impulse response from the measurement of a system input signal and the output signal that the system generates in the time domain. This discussed in Section 7.3.17 where an MLS signal is used as the input signal and the cross correlation (See Section 7.3.16) of the output and input signals is then the system impulse response function.

Alternatively, the impulse response of a system can be determined using a white noise spectrum as the input and taking the DFT of both the input, $x(k)$, and output, $y(k)$, to obtain $X(f_n)$ and $Y(f_n)$, as well as the transfer function in the frequency domain, $H(f_n) = Y(f_n)/X(f_n)$. However, as $X(f_n)$ and $Y(f_n)$ are obtained using a DFT, the inverse discrete Fourier transform (IDFT) in the frequency domain will no longer represent a linear convolution in the time domain, due to the periodicity of the DFT. Thus, $h(k) \neq \text{IDFT}\{H(f_n)\}$. In fact the result for $h(k)$ will be the circular convolution, which is not the same as the linear convolution just discussed. This problem can be avoided by the use of zero padding (see Section 7.3.7) where a number of zeros (equal to the number of samples in the data record) are added to the end of each of the two sampled data records, $x(k)$ and $y(k)$, prior to taking the DFT. If a DFT is then taken of the two sampled time signals, $x(k)$ and $y(k)$, each containing N samples and N zeros following the samples, then $h(k) = \text{IDFT}\{H(f_n)\}$, where $H(f_n) = Y(f_n)/X(f_n)$."