2007

Problem 1.1

(a) At least 8 terms.
(b) 75
(c) There should be no sin terms since it is an even function
(d) piecewise(t < 0.1, 1000*t, t<0.3,100, t<0.4,400-1000*t)

Problem 1.2: Use peaks of the imaginary part of the FRF

Problem 1.3: Be sure to label the displacement of one end of the beam.

Problem 1.4: This is in the notes and in the book

Problem 1.5: This is just like an example we did in class. It will depend how you read the figure, but I got about 3 in.

Problem 1.6: Lower left is correct. Each peak is separated by an antiresonance.

Problem 2

(a) 21.7 rad/s, 29.1 rad/s, $[0.68\ 0.39]^T$, $[-0.195\ 1.36]^T$
(b) 0.025 cos 20t, 0.05 cos20t
(c) Answer not provided – you should have 4 equations and 4 unknowns.

Problem 3

$$\begin{bmatrix} m & 0 \\ 0 & J_0 \end{bmatrix}\begin{Bmatrix} \ddot{x}_1 \\ \ddot{\theta} \end{Bmatrix}+\begin{bmatrix} 0 & 0 \\ 0 & c_1 r_2^2 \end{bmatrix}\begin{Bmatrix} \dot{x}_1 \\ \dot{\theta} \end{Bmatrix}+\begin{bmatrix} k_1 & -k_1 r_1 \\ -k_1 r_1 & k_2 r_2^2 + k_1 r_1^2 \end{bmatrix}\begin{Bmatrix} x_1 \\ \theta \end{Bmatrix}=\begin{Bmatrix} F\cos\theta \\ 0 \end{Bmatrix}$$