

Answer to HW Problem 4.1
ES205

The matrices of the 2nd-order form:

$$\mathbf{M} = \begin{bmatrix} m & 0 & 0 \\ 0 & J_1 & 0 \\ 0 & 0 & J_3 \end{bmatrix}, \quad \mathbf{C} = \begin{bmatrix} c_1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & c_2 \end{bmatrix}, \quad \mathbf{K} = \begin{bmatrix} k_1 & -k_1 r_1 & 0 \\ -k_1 r_1 & r_1^2 k_1 + k_2 & -\frac{r_3}{r_2} k_2 \\ 0 & -\frac{r_3}{r_2} k_2 & \left(\frac{r_3}{r_2}\right)^2 k_2 + k_3 \end{bmatrix}$$