$$p(t) := 10 \sin\left(\frac{\pi \cdot t}{0.6\ s}\right) kip$$

$$m := 0.2533 \cdot \frac{kip \cdot s^2}{in} \qquad k := 10\ \frac{kip}{in} \qquad \omega_n := \sqrt{\frac{k}{m}} = 6.283\ \frac{rad}{s} \qquad \Delta t := 0.1\ s$$

$$u\left(\tau, u_i, u'_i, p_i, \Delta p_i, \Delta t_i\right) := u_i \cdot \cos\left(\omega_n \cdot \tau\right) + \frac{u'_i}{\omega_n} \sin\left(\omega_n \cdot \tau\right) + \frac{p_i}{k} \cdot \left(1 - \cos\left(\omega_n \cdot \tau\right)\right) + \frac{\Delta p_i}{k}\left(\frac{\tau}{\Delta t_i} - \frac{\sin\left(\omega_n \cdot \tau\right)}{\omega_n \cdot \Delta t_i}\right)$$

$$u'\left(\tau, u_i, u'_i, p_i, \Delta p_i, \Delta t_i\right) := \frac{\mathrm{d}}{\mathrm{d}\tau} u\left(\tau, u_i, u'_i, p_i, \Delta p_i, \Delta t_i\right)$$

$$\begin{array}{l}
R(n) := \left\| \begin{array}{l}
T_{\mathbf{ORIGIN}} \leftarrow 0\ s \\
P_{ORIGIN} \leftarrow p\left(T_{\mathbf{ORIGIN}}\right) \\
U_{\mathbf{ORIGIN}} \leftarrow u\left(T_{\mathbf{ORIGIN}}, 0\ in, 0\ \frac{in}{s}, P_{\mathbf{ORIGIN}}, 0\ kip, \Delta t\right) \\
U'_{\mathbf{ORIGIN}} \leftarrow u'\left(T_{\mathbf{ORIGIN}}, 0\ in, 0\ \frac{in}{s}, P_{\mathbf{ORIGIN}}, 0\ kip, \Delta t\right) \\
\text{for } i \in \mathbf{ORIGIN}+1\ ..\ \mathbf{ORIGIN}+n \\
\quad \left\| \begin{array}{l}
T_i \leftarrow T_{i-1} + \Delta t \\
P_i \leftarrow p\left(T_i\right) \\
U'_i \leftarrow u'\left(T_i, U_{i-1}, U'_{i-1}, P_i, P_i - P_{i-1}, \Delta t\right) \\
U_i \leftarrow u\left(T_i, U_{i-1}, U'_{i-1}, P_i, P_i - P_{i-1}, \Delta t\right)
\end{array} \right. \\
\text{return augment}\left(U, U', P, T\right)
\end{array} \right.
\end{array}$$

$$R := R(10) \qquad U := R^{\langle \mathbf{ORIGIN} \rangle} \qquad U' := R^{\langle \mathbf{ORIGIN}+1 \rangle} \qquad P := R^{\langle \mathbf{ORIGIN}+2 \rangle} \qquad T := R^{\langle \mathbf{ORIGIN}+3 \rangle}$$

$$U = \begin{bmatrix} 0 \\ 0.128 \\ 1.24 \\ 2.307 \\ -0.906 \\ 0.076 \\ -3.41 \\ -2.686 \\ -1.65 \\ -0.98 \\ 0.36 \end{bmatrix} in \qquad U' = \begin{bmatrix} 0 \\ 2.802 \\ 7.807 \\ -2.093 \\ -6.051 \\ -1.27 \\ -7.738 \\ -21.544 \\ -20.064 \\ -18.888 \\ -18.888 \end{bmatrix} \frac{in}{s}$$

its not working, but i appreciate ur interest to help me!!

to include $\xi := 5\%$ in the calculations, to use the COEFFICIENTS IN RECURRENCE FORMULAS