

$$\begin{array}{ccc}
 \xrightarrow{\quad} & & \xrightarrow{\quad} \\
 X := 0 \text{ kip}, \frac{F_o}{8} \dots F_o = & & Y := F_o, F_o - \frac{F_o}{8} \dots 0 \text{ kip} = \\
 \begin{bmatrix} 0 \\ 15 \\ 30 \\ 45 \\ 60 \\ 75 \\ 90 \\ 105 \\ 120 \end{bmatrix} \text{ kip} & & \begin{bmatrix} 120 \\ 105 \\ 90 \\ 75 \\ 60 \\ 45 \\ 30 \\ 15 \\ 0 \end{bmatrix} \text{ kip} \\
 & & F := \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} \text{ kip}
 \end{array}$$

$$P := \text{stack}(X, Y, -X, -Y, X, Y, -X, -Y, X, Y, -X, -Y, X, Y, -X, -Y, X, Y, -X, -Y, F)$$

$$Accn := \frac{\vec{P}}{m} = \begin{bmatrix} 0 \\ 46.33 \\ \vdots \end{bmatrix} \frac{\text{in}}{\text{s}^2}$$

$$\begin{array}{l}
 U := \\
 \left| \begin{array}{l}
 p \leftarrow -P \\
 U_1 \leftarrow 0 \text{ in} \\
 \\
 U'_1 \leftarrow 0 \frac{\text{in}}{\text{s}} \\
 U''_1 \leftarrow 0 \frac{\text{in}}{\text{s}^2} \\
 \\
 um \leftarrow U_1 - \Delta t_a \cdot U'_1 + \frac{\Delta t_a^2}{2} \cdot U''_1 \\
 \\
 \hat{k} \leftarrow \frac{m}{\Delta t_a^2} + \frac{c}{2 \cdot \Delta t_a} \\
 a \leftarrow \frac{m}{\Delta t_a^2} - \frac{c}{2 \cdot \Delta t_a} \\
 b \leftarrow \hat{k} - \frac{2 \cdot m}{\Delta t_a^2} \\
 n \leftarrow \text{rows}(t_a) \\
 \text{for } i \in 1 .. n - 2 \\
 \left| \left| \begin{array}{l}
 \hat{p}_i \leftarrow p - (a \cdot \text{if}(i = 1, um, U_{i-1})) - (b \cdot U_i) \\
 \\
 U_{i+1} \leftarrow \frac{\hat{p}_i}{\hat{k}} \\
 \\
 U'_{i+1} \leftarrow \frac{U_{i+1} - \text{if}(i = 1, um, U_{i-1})}{2 \cdot \Delta t_a} \\
 \\
 U''_{i+1} \leftarrow \frac{U_{i+1} - 2 \cdot U_i + \text{if}(i = 1, um, U_{i-1})}{\Delta t_a^2} \\
 \\
 \hat{p}_{i+1} \leftarrow 0 \\
 \\
 U'' \leftarrow \frac{U''}{g} \\
 U \leftarrow \text{augment}(\hat{p}, U, U', U'') \\
 U
 \end{array} \right. \right.
 \end{array} \right.
 \end{array}$$