Assignment 4 (July 13, Submit in a week) For the 3DOF system of Assignment 2, compute peak response displacement at the mass 1, 2 and 3 based on the response spectrum method. Assume JMA Kobe ground motion.

- 1) Structural properties and assumptions
- Assume that

m = 150 kN / g = 150 / 9.8

 $\xi_r = 0.05$ 

$$k_1 = k$$
$$k_2 = 2k$$
$$k_3 = 3k$$

k = 3050.9 kN / m



•Natural periods and mode shapes  $\omega_1 = 9.10 rad / s$   $T_1 = 0.690 s$   $\omega_2 = 21.4 rad / s$   $T_2 = 0.294 s$  $\omega_3 = 35.4 rad / s$   $T_3 = 0.177 s$ 





## Modal matrix

$$\begin{bmatrix} \Phi \end{bmatrix} = \begin{bmatrix} 1.00 & -0.773 & 0.122 \\ 0.584 & 1.00 & -0.645 \\ 0.255 & 0.739 & 1.00 \end{bmatrix}$$

2) Compute response at mass 1, 2 and 3 based on the RMS approximation of the response spectrum method following Eq. (9.79).

## •Use the response displacement spectrum of JMA Kobe ground motion

