

## Assignment 1

Create an idealized shear building structure, in other words assemble mass, damping, and stiffness matrices. Assume the first modal damping ratio is 0.02% and that the damping is stiffness proportional. Solve the associated eigenvalue problem to determine the modal frequencies and mode shapes. Order the frequencies in ascending order and normalize the mode shapes by roof displacement

An acceleration history obtained from the [PEER strong motion database](#) for the 1989 Loma Prieta Earthquake (57217 Coyote Lake Dam, SW Abut) is provided in the relevant material section. The units are in  $g$  and a time step of 0.005 s. Using the provided Newmark Integrator function, predict the scale structure's response to the Loma Prieta ground motion. Plot the individual story accelerations along with the base excitation.

Plot the following response quantities and determine their maximums

1. Roof Displacement
2. Interstory Drift between floors 2 & 3
3. Base Shear
4. Overturning Moment