Passive Structural Control (HW 7)

You are required to describe the modeling procedure and discussion.

1. **Design of the isolation system**

   (*For saving your time, you can only consider the longitudinal direction of the model.*)

   Please design the isolation system with LRBs for the model you built in HW 1 according to the following different conditions.

   Please scale the time history record (I-ELC270) to PGA=0.4g and use it for time history analysis.

   (a)

   The period of isolated structure is equal to 2.5 sec, and damping ratio is 25%.

   Base on the situation, please decide the **effect stiffness K_{eff}** for isolation systems, **yielding force F_y** and **characteristic strength Q_d** for single LRB with post yielding ratio equal to 0.1.

   (b) Assume the design purpose is to keep the upper structure in elastic. On the other words, you have to let the drift ratio less than a specific criteria, say 0.5 % for this problem. Please design the reasonable T_e, K_{eff}, ξ_d for isolation systems, F_y and Q_d for single LRB with post yielding ratio equal to 0.1. Use time history analysis to verify your design and draw the acceleration responses of top floor and displacement responses of isolation layer for both isolated structure and bare frame, and comparing the maximum drift ratio for both isolated structure and bare frame. Also need to draw the hysteresis loop of

the LRB. (hint: you may design the isolation system by referring to the results of the problem (a), but do not use the same design period in problem (a).)

2. Reading Assignment

"Simplified analysis of mid-story seismically isolated buildings"

Please type one page of what you've learned from this paper.