

## Homework #7

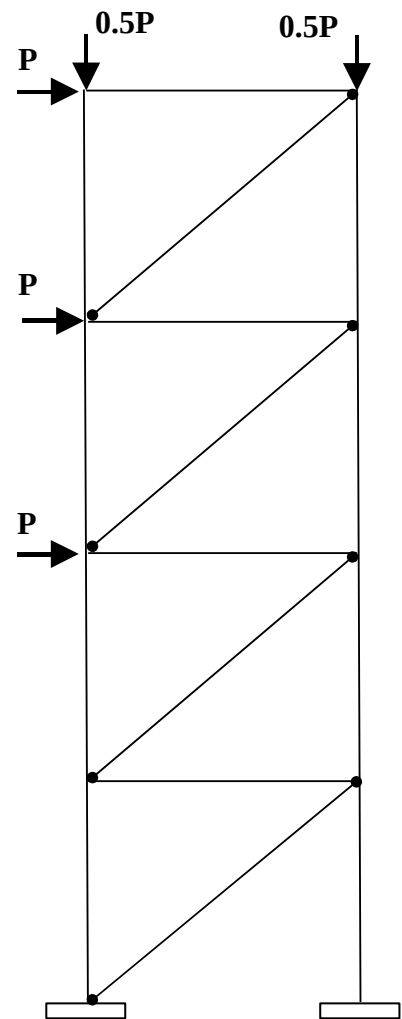
Assigned on Friday, Mar 06; due on Tuesday, Mar 17

A system has two continuous columns with fixed bases and rigidly connected beams and pin connected braces, as shown in **Figure 1**. Use incremental load analysis (with DRAIN-2DX) up to the failure of the structure and find the maximum allowable load **P**. Do this exercise a) considering P-M interaction, and b) not considering P-M interaction.

The member dimensions are given below. Assume steel I-beam type P-M interaction diagram for beam/column members. Don't consider large deformation effects.

Take,

$\{m_4 m_3 m_2 m_1\} = \{1350 1250 1250 1250\}$  kg-mass  
 $A = 600 \text{ cm}^2$ ,  $Z = 23000 \text{ cm}^3$ , &  $I = 950000 \text{ cm}^4$  for columns  
 $A = 150 \text{ cm}^2$ ,  $Z = 4500 \text{ cm}^3$ , &  $I = 181000 \text{ cm}^4$  for beams  
 $\{A_4 A_3 A_2 A_1\} = \{150 200 225 235\} \text{ cm}^2$  for braces  
 $\sigma_y = 250 \text{ MPa}$  for all members  
 $\sigma_{cr} = 100 \text{ MPa}$  for braces  
 Floor height = bay width = 4 m.



**Figure 1.** Moment resisting frame with pin-connected braces.