



University of Kurdistan Hewlêr

SCHOOL OF SCIENCE AND ENGINEERING
DEPARTMENT OF CIVIL AND ARCHITECTURAL ENGINEERING
INTRODUCTION TO EARTHQUAKE ENGINEERING

MAJOR ASSIGNMENT

Submission deadline: Thursday 25/06/2020 at 2:30pm

Question 1: Perform the Eigen value analysis and find the Eigen values (Natural frequencies) and Eigen vectors (Natural mode shapes) for the 3-story building shown in Figure Q1.

$$k_1=k_2=k_3= 10.36 \times 10^6 \text{ N/m}$$

$$m_1=m_2=m_3= 2250 \text{ kg}$$

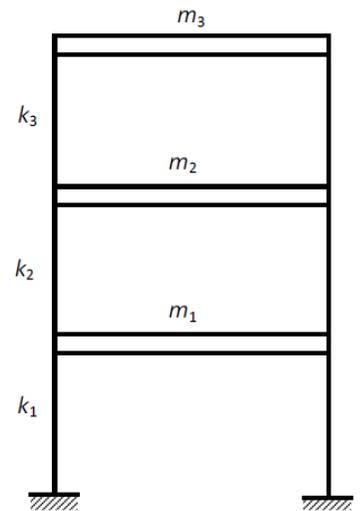


Figure Q1

Question 2: For the 3-story building in Question 1, determine the maximum displacement in each floor due to El-Centro, 1940 earthquake ground motion using the response spectrum method. Assume the damping ratio is 2%.

Question 3: Determine, using the equivalent lateral force procedure, the maximum lateral forces and lateral displacements induced on the 3-story building of Question 1 by the ground accelerations recorded during the 1940 El Centro, California, earthquake. Assume that the damping ratio in the fundamental mode of the building is 2%.