Homework 4:

1. Determine the length of BC span such that the vertical deflection of A and D points are zero \( (\delta_A = \delta_D = 0) \). \( (x = ?) \)

2. Determine the support moments and forces and calculate the deflection under the load. \( (M_A, M_c \text{ and } \delta_B = ?) \).

3. Calculate the support forces. \( (F_A^x, F_A^y, F_D^x \text{ and } F_D^y = ?) \).

4. Calculate the support forces and rotation of joints \( (F_A^x, F_R^y, M_A, F_C^x, F_C^y \text{ and } \theta_C = ?) \).
5. Determine the conjugate beam in the following beams:

(a) \[ e_1 \quad e_1 \quad e_1 \quad e_1 \quad e_1 \]

(b) \[ e_1 \quad e_1 \quad e_1 \quad e_1 \quad e_1 \]

6. Calculate \( \theta^k_B \) and \( \theta^L_B \) using conjugate beam method.

7. Calculate \( S^L_B \) using conjugate beam method.