

1. (1) 試推導局部座標之桁架元素勁度矩陣 k' 。(10%)

$$q = k' d$$

式中 $q^T = [q_1, q_2]$, $d^T = [d_1, d_2]$

- (2) 試推導整體座標之桁架元素勁度矩陣 k 。(10%)

$$Q = k D$$

式中 $Q^T = [Q_1, Q_2, Q_3, Q_4]$, $D^T = [D_1, D_2, D_3, D_4]$

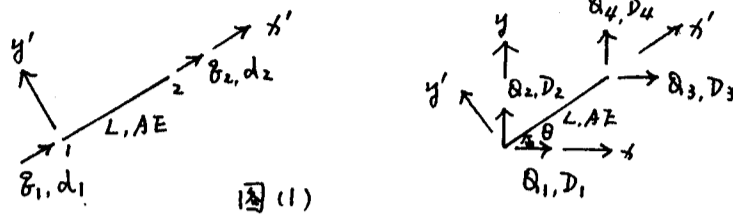
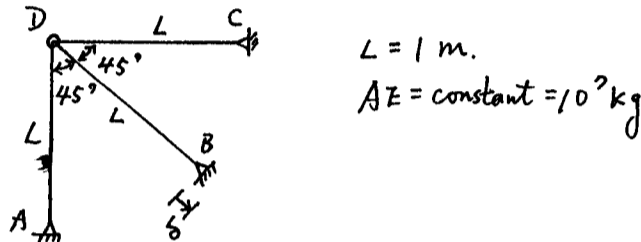


圖 (1)

2. 如圖(2)所示之桁架，如支點B在BD方向產生沉陷 $\delta = 0.1 \text{ cm}$ 。試以矩陣勁度法(matrix stiffness method)求圖(2)桁架之桿件內力、支點反力以及D點變位。(20%)



$$L = 1 \text{ m.}$$

$$AE = \text{constant} = 10^7 \text{ kg}$$

圖 (2)

3. 如圖(3)所示之梁。

- (1) 試求支點反力、B點垂直變位與相對轉角。(15%)

- (2) 試繪剪力圖、彎矩圖與彈性變形曲線。(10%)

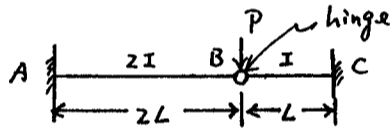


圖 (3)

4. 如圖(4)所示之剛架。

- (1) 試以傾角變位法(slope-deflection method)解之，並繪剪力圖、彎矩圖與彈性變形曲線。(25%)

- (2) 試以近似解法(如Portal method)求此剛架之支點反力。(10%)

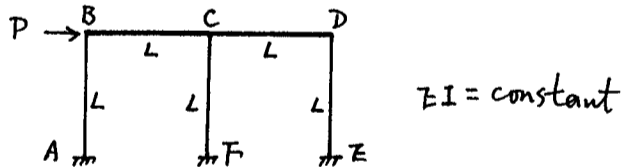


圖 (4)