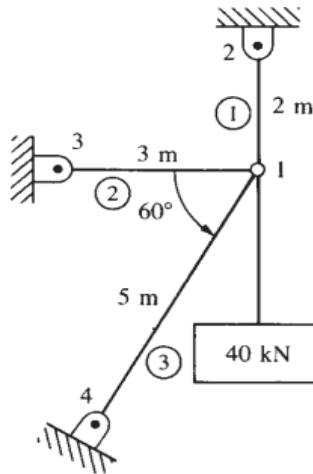1. For the plane truss shown in the figure, determine the horizontal and vertical displacements of node 1 and force in each elements. For all elements E=210 Gpa, A=4×10⁻⁴m².
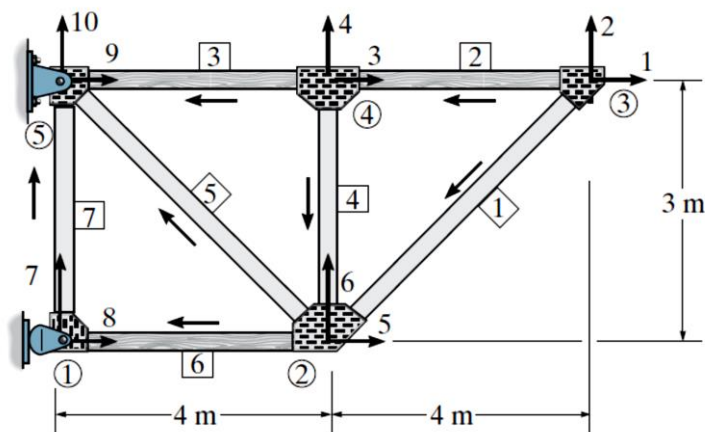
(Ref:The First Course in the Finite Element, D. L. Logan, 4th Edition)

2. Determine the force in member 5 and the vertical displacement of node ② if member 6 was 10mm too long before it was fitted into the truss.
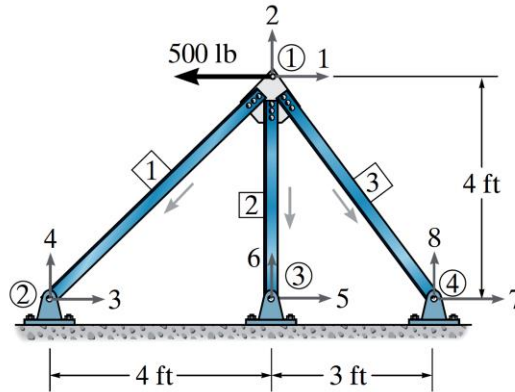
Take A = 0.0015 m² and E = 200 GPa for each Member.

(Ref: R.C. Structural Analysis, Hibbeler ,8th Ed.)

3. Determine the force in member 2 if its temperature is increased by 100 °F. Take $a = 6.5(10^{-6})/$ °F. $A = 0.75$ in^2, $E = 29(10^3)$ ksi,
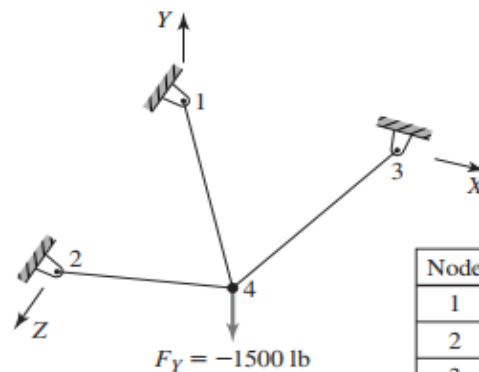
(Ref: R.C. Structural Analysis, Hibbeler, 8th Ed.)

4. Assemble the global stiffness matrix of the 3-D truss shown in the figure and compute the displacement components of node 4. Coordinates given in inches.
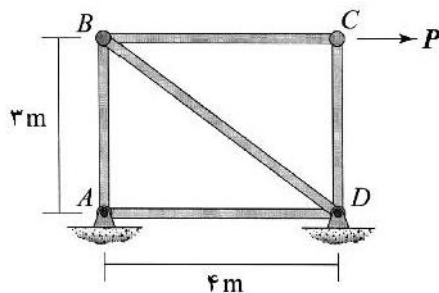
For each element $E = 10 \times 10^6$ psi, $A = 1.5$ in^2

(Ref: Fundamentals of finite element analysis, D.V. Hutton)

Node	X	Y	Z
1	0	0	0
2	0	0	30
3	40	0	0
4	30	−20	25

$F_Y = -1500$ lb

۵- پس از اعمال بار P، عضو BD به چه میزان نسبت به موقعیت اولیه خود دوران پیدا می‌کند؟ (EA تمام اعضا یکسان است. از روش تحلیل ماتریسی مسئله را حل کنید.)

1) 19P/6EA

2) 15P/2EA

3) 3P/2EA

4) 9P/16EA