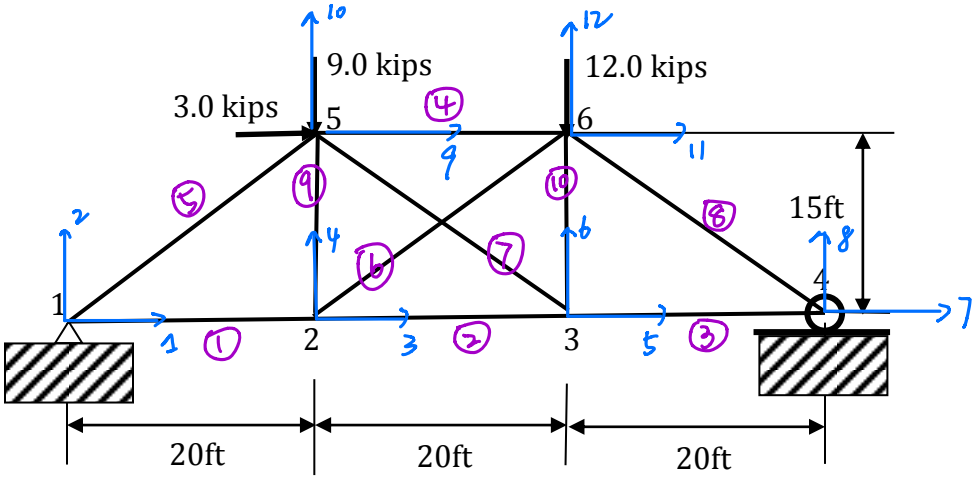
SE 276A/MAE 232A Finite Elements in Solid Mechanics I **J. S. Chen**
Fall 2018

Computer Assignment #1. Due October 16, 2018

Use finite element method to analyze the following planar truss structure. All truss members are considered linear elastic.



Cross-sectional area is 1.0 ft^2; E = 30×10^6 psf (lb/ft^2)

1. Obtain displacements at all nodes.
2. Obtain reaction forces at the supports.
3. Obtain axial stress in all members.

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>> Computer_Assignment1_BoXiao

Force_Table =

  12×2 table

    F_index    F_in_lbs
    _______    ________

node1 ['F1'         -3000
       'F2'          9250
node2 ['F3'             0
       'F4'             0
node3 ['F5'             0
       'F6'             0
node4 ['F7'             0
       'F8'         11750
node5 ['F9'          3000
       'F10'        -9000
node6 ['F11'            0
       'F12'       -12000
```

1. Displacement_Table =

```
  12×2 table

    U_index     U_in_ft
    _______    _________

node1 ['u1'              0
       'u2'              0
node2 ['u3'       0.010222
       'u4'      -0.050792
node3 ['u5'       0.020556
       'u6'       -0.05293
node4 ['u7'          0.031
       'u8'              0
node5 ['u9'       0.021988
       'u10'      -0.05073
node6 ['u11'      0.011655
       'u12'     -0.052992
```

2. Reaction forces at supports are

$F_1 = -3000$ lbs , $F_2 = 9250$ lbs at node 1

$F_7 = 0$ lbs , $F_8 = 11750$ lbs at node 4.

3. Aixal_Stress_Table =

```
  10×2 table

      Element_index       Axial_Stress_psf
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'Element1 node(1,2)'	15333
'Element2 node(2,3)'	15500
'Element3 node(3,4)'	15667
'Element4 node(5,6)'	-15500
'Element5 node(1,5)'	-15417
'Element6 node(2,6)'	-208.33
'Element7 node(3,5)'	208.33
'Element8 node(4,6)'	-19583
'Element9 node(2,5)'	125
'Element10 node(3,6)'	-125

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