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% AEM 4501 Homework 4 problem 4
a = 3; b = 2; c = 2.5; % Truss size
F = 100000; G = 50000; % Load in Newton

MatsSets(1).E = 70e9; % Pa
MatsSets(1).A = 0.0015; % m^2
MatsSets(1).rho = 8.1; % density

PD.N = 8; % Number of nodes
PD.NodePos = [0, 0, b;
              a, 0, b;
              0, c, b;
              a, c, b;
              a, c, 0;
              a, 0, 0;
              0, 0, 0;
              0, c, 0];
PD.NE = 18; % Number of Elements
PD.ElmConnect = [1, 2;
                 1, 3;
                 3, 4;
                 2, 4;
                 2, 3;
                 1, 7;
                 3, 7;
                 3, 8;
                 8, 7;
                 8, 5;
                 5, 7;
                 7, 6;
                 6, 5;
                 6, 2;
                 2, 5;
                 5, 4;
                 5, 3;
                 2, 7];

PD.NM = 1;
PD.MatsSets = MatsSets;
PD.ElmMats = ones(18,1);
PD.BCType = [1, 0, 1;
             0, 1, 1;
             0, 0, 0;
             0, 0, 0;
             0, 0, 0;
             0, 0, 0;
             0, 0, 0;
             0, 0, 0;
             1, 1, 0];
PD.BCVal = [0, 0, 0;
            0, 0, 0;
            G, -F, 0;
            0, 0, 0;
            0, 0, 0];
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        0, 0, 0;
        0, 0, 0;
        0, 0, 0];
PDans = PD_truss_static(PD);
PlotTruss(PDans,1000,'y','y');
view(3);

%disp(PDans.ElmForce)
%disp(PDans.ElmStress)
% loop for the forces and stresses in all the elements
for i = 1:PD.NE
    force = PDans.ElmForce(i); %(unit Newton for force)

    disp(['Force in element ', num2str(i), ':', num2str(force)]);

    stress = PDans.ElmStress(i); %(unit Pascal for Stress)
    disp(['Stress in element ', num2str(i), ':', num2str(stress)]);

    disp(' ');
end

% Deflections at nodes A (3) and G (6) (unit meter)
disp('Deflection at node A: ');
disp(PDans.U(3,:));
disp('Deflection at node G: ');
disp(PDans.U(6,:));

Force in element 1:120000
Stress in element 1:80000000

Force in element 2:0
Stress in element 2:0

Force in element 3:-5.8208e-11
Stress in element 3:-3.8805e-08

Force in element 4:0
Stress in element 4:0

Force in element 5:-110645.2037
Stress in element 5:-73763469.1613

Force in element 6:46666.6667
Stress in element 6:31111111.1111

Force in element 7:-37351.5581
Stress in element 7:-24901038.7011

Force in element 8:0
Stress in element 8:0

Force in element 9:-2.4322e-11
Stress in element 9:-1.6214e-08

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Force in element 10:-70000  
Stress in element 10:-46666666.6667

Force in element 11:45559.7898  
Stress in element 11:30373193.1841

Force in element 12:0  
Stress in element 12:0

Force in element 13:-1.1642e-10  
Stress in element 13:-7.761e-08

Force in element 14:0  
Stress in element 14:0

Force in element 15:-37351.5581  
Stress in element 15:-24901038.7011

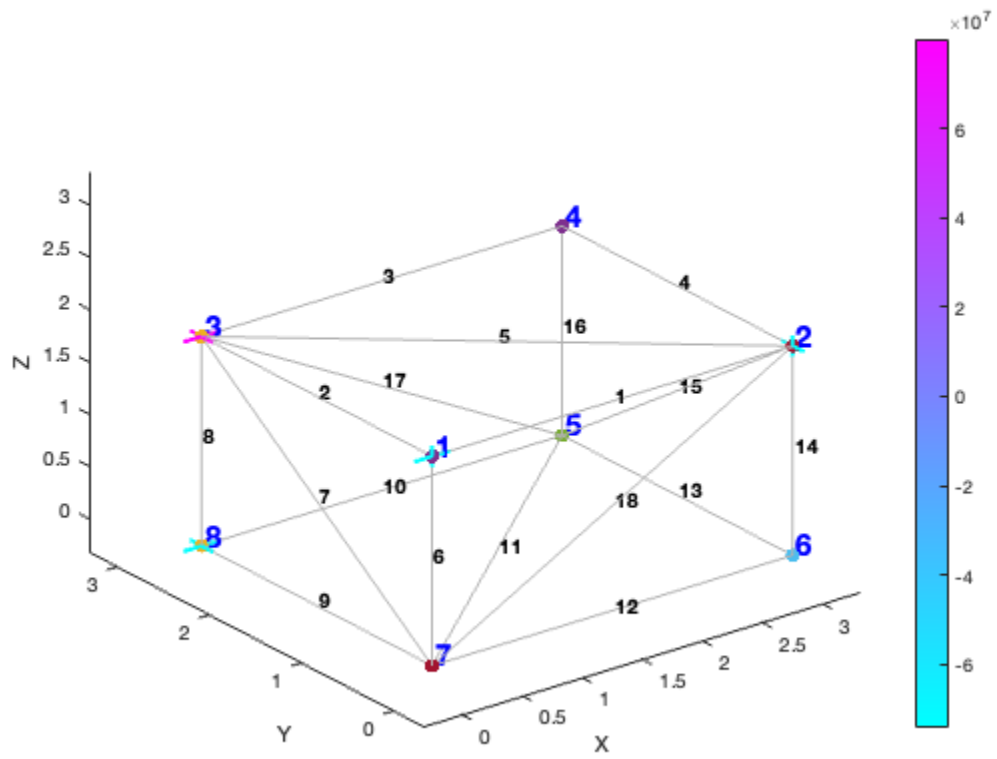
Force in element 16:0  
Stress in element 16:0

Force in element 17:42064.7649  
Stress in element 17:28043176.5869

Force in element 18:-42064.7649  
Stress in element 18:-28043176.5869

Deflection at node A:  
-0.0040    -0.0153    0.0164

Deflection at node G:  
0.0058    0.0120    0



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