Table of Contents

Problem 1

```
clear; close all; clc;
syms x1 x h del1 del2 del3 del4 del5 del6 phi;
xmatrix = [ 1, x1, x1^2, x1^3, x1^4, x1^5;
            0, 1, 2*x1, 3*x1^2, 4*x1^3, 5*x1^4;
            0, 0, 2, 6*x1, 12*x1^2, 20*x1^3;
            1, x1+h, (x1+h)^2, (x1+h)^3, (x1+h)^4, (x1+h)^5;
            0, 1, 2*(x1+h), 3*(x1+h)^2, 4*(x1+h)^3, 5*(x1+h)^4;
            0, 0, 2, 6*(x1+h), 12*(x1+h)^2, 20*(x1+h)^3];
delvec = [del1;del2;del3;del4;del5;del6];
cvec = inv(xmatrix)*delvec;
wcluttered = cvec(1) + cvec(2)*x + cvec(3)*x^2 + cvec(4)*x^3 +
 cvec(5)*x^4 + cvec(6)*x^5;
w = collect(wcluttered, [del1, del2, del3, del4, del5, del6]);
phi1 = simplify(solve( del1*phi == subs(w,[del2, del3, del4, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi2 = simplify(solve( del2*phi == subs(w,[del1, del3, del4, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi3 = simplify(solve( del3*phi == subs(w,[del1, del2, del4, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi4 = simplify(solve( del4*phi == subs(w,[del1, del2, del3, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi5 = simplify(solve( del5*phi == subs(w,[del1, del2, del3, del4,
 del6, x1], [0 0 0 0 0 0]),phi));
phi6 = simplify(solve( del6*phi == subs(w,[del1, del2, del3, del4,
 del5, x1], [0 0 0 0 0 0]),phi));
fprintf("Problem 1 \n")
fprintf("phi1 = %s \n",phi1)
fprintf("phi2 = %s \n",phi2)
fprintf("phi3 = %s \n",phi3)
fprintf("phi4 = %s \n",phi4)
fprintf("phi5 = %s \n",phi5)
fprintf("phi6 = %s \n",phi6)
fprintf("phi1, phi2, phi3 are for node 1\n")
```

```
Problem 1
phi1 = ((h - x)^3*(3*h*x + h^2 + 6*x^2))/h^5
phi2 = (x*(h - x)^3*(h + 3*x))/h^4
phi3 = (x^2*(h - x)^3)/(2*h^3)
phi4 = (x^3*(10*h^2 - 15*h*x + 6*x^2))/h^5
phi5 = -(x^3*(4*h^2 - 7*h*x + 3*x^2))/h^4
phi6 = (x^3*(h - x)^2)/(2*h^3)
```

```
phi1, phi2, phi3 are for node 1
```

Problem 2

```
clear;
syms x1 x h del1 del2 del3 del4 del5 del6 phi;
xmatrix = [ 1, x1, x1^2, x1^3, x1^4, x1^5;
            0, -1, -2*x1, -3*x1^2, -4*x1^3, -5*x1^4;
            1, (x1+h/2), (x1+h/2)^2, (x1+h/2)^3, (x1+h/2)^4,
 (x1+h/2)^5;
            0, -1, -2*(x1+h/2), -3*(x1+h/2)^2, -4*(x1+h/2)^3,
 -5*(x1+h/2)^4;
            1, (x1+h), (x1+h)^2, (x1+h)^3, (x1+h)^4, (x1+h)^5;
            0, -1, -2*(x1+h), -3*(x1+h)^2, -4*(x1+h)^3, -5*(x1+h)^4];
delvec = [del1;del2;del3;del4;del5;del6];
cvec = inv(xmatrix)*delvec;
wcluttered = cvec(1) + cvec(2)*x + cvec(3)*x^2 + cvec(4)*x^3 +
 cvec(5)*x^4 + cvec(6)*x^5;
w = collect(wcluttered, [del1, del2, del3, del4, del5, del6]);
phi1 = simplify(solve( del1*phi == subs(w,[del2, del3, del4, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi2 = simplify(solve( del2*phi == subs(w,[del1, del3, del4, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi3 = simplify(solve( del3*phi == subs(w,[del1, del2, del4, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi4 = simplify(solve( del4*phi == subs(w,[del1, del2, del3, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi5 = simplify(solve( del5*phi == subs(w,[del1, del2, del3, del4,
 del6, x1], [0 0 0 0 0 0]),phi));
phi6 = simplify(solve( del6*phi == subs(w,[del1, del2, del3, del4,
 del5, x1], [0 0 0 0 0 0]),phi));
fprintf("\nProblem 2 \n")
fprintf("phi1 = %s \n",phi1)
fprintf("phi2 = %s \n",phi2)
fprintf("phi3 = %s \n",phi3)
fprintf("phi4 = %s \n",phi4)
fprintf("phi5 = %s \n",phi5)
fprintf("phi6 = %s \n",phi6)
fprintf("phi1, phi2 are for node 1\n")
```

```
Problem 2
phi1 = ((h + 6*x)*(h^2 - 3*h*x + 2*x^2)^2)/h^5
phi2 = -(x*(h^2 - 3*h*x + 2*x^2)^2)/h^4
phi3 = (16*x^2*(h - x)^2)/h^4
phi4 = (8*x^2*(h - x)^2*(h - 2*x))/h^4
phi5 = (x^2*(h - 2*x)^2*(7*h - 6*x))/h^5
phi6 = (x^2*(h - x)*(h - 2*x)^2)/h^4
phi1, phi2 are for node 1
```

Problem 3

```
clear;
```

```
syms x1 x h del1 del2 del3 del4 del5 del6 phi q1 q2;
xmatrix = [ 1, x1, x1^2, x1^3, x1^4, x1^5;
            0, 1, 2*x1, 3*x1^2, 4*x1^3, 5*x1^4;
            0, 0, 2, 6*x1, 12*x1^2, 20*x1^3;
            1, x1+h, (x1+h)^2, (x1+h)^3, (x1+h)^4, (x1+h)^5;
            0, 1, 2*(x1+h), 3*(x1+h)^2, 4*(x1+h)^3, 5*(x1+h)^4;
            0, 0, 2, 6*(x1+h), 12*(x1+h)^2, 20*(x1+h)^3];
delvec = [del1;del2;del3;del4;del5;del6];
cvec = inv(xmatrix)*delvec;
wcluttered = cvec(1) + cvec(2)*x + cvec(3)*x^2 + cvec(4)*x^3 +
 cvec(5)*x^4 + cvec(6)*x^5;
w = collect(wcluttered, [del1, del2, del3, del4, del5, del6]);
phi1 = simplify(solve( del1*phi == subs(w,[del2, del3, del4, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi2 = simplify(solve( del2*phi == subs(w,[del1, del3, del4, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi3 = simplify(solve( del3*phi == subs(w,[del1, del2, del4, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi4 = simplify(solve( del4*phi == subs(w,[del1, del2, del3, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi5 = simplify(solve( del5*phi == subs(w,[del1, del2, del3, del4,
 del6, x1], [0 0 0 0 0 0]),phi));
phi6 = simplify(solve( del6*phi == subs(w,[del1, del2, del3, del4,
 del5, x1], [0 0 0 0 0 0]),phi));
fprintf("\nProblem 3 \n")
fprintf("phi1 = %s \n",phi1)
fprintf("phi2 = %s \n",phi2)
fprintf("phi3 = %s \n",phi3)
fprintf("phi4 = %s \n",phi4)
fprintf("phi5 = %s \n",phi5)
fprintf("phi6 = %s \n",phi6)
q = [   int(((q1+x*(q2-q1)/h)*phi1),x,0,h);
        int(((q1+x*(q2-q1)/h)*phi2),x,0,h);
        int(((q1+x*(q2-q1)/h)*phi3),x,0,h);
        int(((q1+x*(q2-q1)/h)*phi4),x,0,h);
        int(((q1+x*(q2-q1)/h)*phi5),x,0,h);
        int(((q1+x*(q2-q1)/h)*phi6),x,0,h)];
for ii = 1:6
    fprintf("q_%i = %s \n",ii, q(ii))
end
fprintf("q_1, q_2, q_3 are the components of the source vector for
 node 1\n")
```

```
Problem 3
phi1 = ((h - x)^3*(3*h*x + h^2 + 6*x^2))/h^5
phi2 = (x*(h - x)^3*(h + 3*x))/h^4
phi3 = (x^2*(h - x)^3)/(2*h^3)
phi4 = (x^3*(10*h^2 - 15*h*x + 6*x^2))/h^5
phi5 = -(x^3*(4*h^2 - 7*h*x + 3*x^2))/h^4
phi6 = (x^3*(h - x)^2)/(2*h^3)
q_1 = (h*(5*q1 + 2*q2))/14
q_2 = (h^2*(13*q1 + 8*q2))/210
q_3 = (h^3*(4*q1 + 3*q2))/840
```

```
q_4 = (h*(2*q1 + 5*q2))/14
q_5 = -(h^2*(8*q1 + 13*q2))/210
q_6 = (h^3*(3*q1 + 4*q2))/840
q_1, q_2, q_3 are the components of the source vector for node 1
```

Problem 4

```
clear;
syms x1 x h del1 del2 del3 del4 del5 del6 phi q1 q2;
xmatrix = [ 1, x1, x1^2, x1^3, x1^4, x1^5;
            0, -1, -2*x1, -3*x1^2, -4*x1^3, -5*x1^4;
            1, (x1+h/2), (x1+h/2)^2, (x1+h/2)^3, (x1+h/2)^4,
 (x1+h/2)^5;
            0, -1, -2*(x1+h/2), -3*(x1+h/2)^2, -4*(x1+h/2)^3,
 -5*(x1+h/2)^4;
            1, (x1+h), (x1+h)^2, (x1+h)^3, (x1+h)^4, (x1+h)^5;
            0, -1, -2*(x1+h), -3*(x1+h)^2, -4*(x1+h)^3, -5*(x1+h)^4];
delvec = [del1;del2;del3;del4;del5;del6];
cvec = inv(xmatrix)*delvec;
wcluttered = cvec(1) + cvec(2)*x + cvec(3)*x^2 + cvec(4)*x^3 +
 cvec(5)*x^4 + cvec(6)*x^5;
w = collect(wcluttered, [del1, del2, del3, del4, del5, del6]);
phi1 = simplify(solve( del1*phi == subs(w,[del2, del3, del4, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi2 = simplify(solve( del2*phi == subs(w,[del1, del3, del4, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi3 = simplify(solve( del3*phi == subs(w,[del1, del2, del4, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi4 = simplify(solve( del4*phi == subs(w,[del1, del2, del3, del5,
 del6, x1], [0 0 0 0 0 0]),phi));
phi5 = simplify(solve( del5*phi == subs(w,[del1, del2, del3, del4,
 del6, x1], [0 0 0 0 0 0]),phi));
phi6 = simplify(solve( del6*phi == subs(w,[del1, del2, del3, del4,
 del5, x1], [0 0 0 0 0 0]),phi));
fprintf("\nProblem 4 \n")
fprintf("phi1 = %s \n",phi1)
fprintf("phi2 = %s \n",phi2)
fprintf("phi3 = %s \n",phi3)
fprintf("phi4 = %s \n",phi4)
fprintf("phi5 = %s \n",phi5)
fprintf("phi6 = %s \n",phi6)
q = [   int(((q1+x*(q2-q1)/h)*phi1),x,0,h);
        int(((q1+x*(q2-q1)/h)*phi2),x,0,h);
        int(((q1+x*(q2-q1)/h)*phi3),x,0,h);
        int(((q1+x*(q2-q1)/h)*phi4),x,0,h);
        int(((q1+x*(q2-q1)/h)*phi5),x,0,h);
        int(((q1+x*(q2-q1)/h)*phi6),x,0,h)];
for ii = 1:6
    fprintf("q_%i = %s \n",ii, q(ii))
end
fprintf("The source vector components for node 1 are q_1 and q_2\n")
fprintf("The source vector components for node 2 are q_3 and q_4\n")
fprintf("The source vector components for node 1 are q_5 and q_6\n")
```

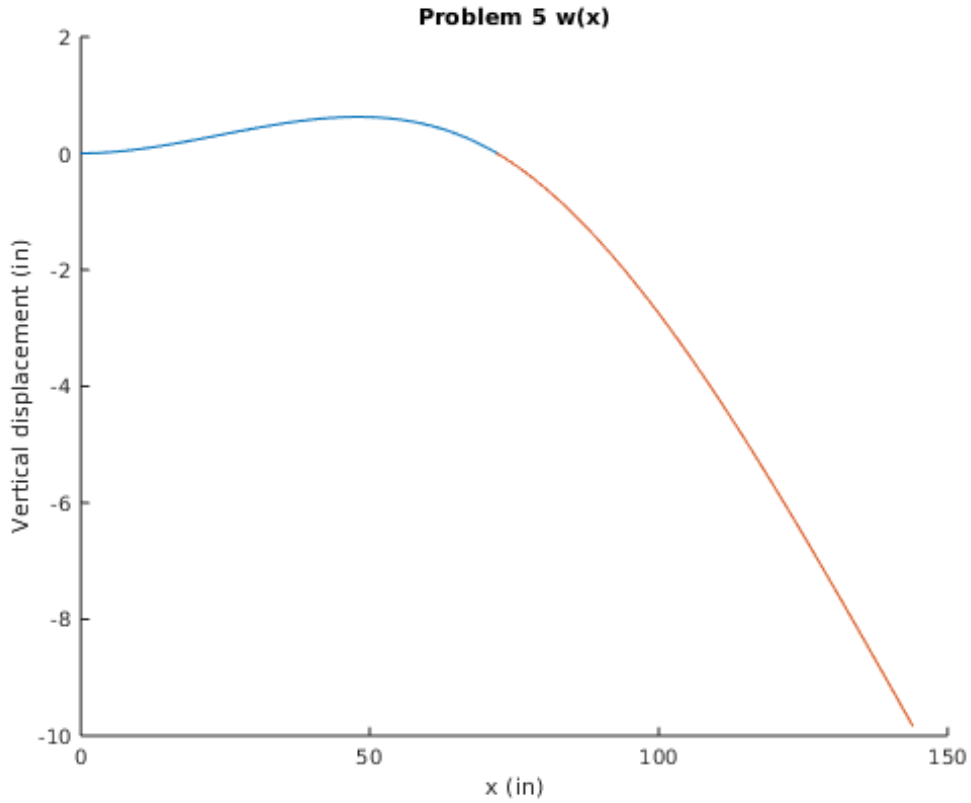
```
Problem 4
phi1 = ((h + 6*x)*(h^2 - 3*h*x + 2*x^2)^2)/h^5
phi2 = -(x*(h^2 - 3*h*x + 2*x^2)^2)/h^4
phi3 = (16*x^2*(h - x)^2)/h^4
phi4 = (8*x^2*(h - x)^2*(h - 2*x))/h^4
phi5 = (x^2*(h - 2*x)^2*(7*h - 6*x))/h^5
phi6 = (x^2*(h - x)*(h - 2*x)^2)/h^4
q_1 = (h*(79*q1 + 19*q2))/420
q_2 = -(h^2*(5*q1 + 2*q2))/420
q_3 = (4*h*(q1 + q2))/15
q_4 = (2*h^2*(q1 - q2))/105
q_5 = (h*(19*q1 + 79*q2))/420
q_6 = (h^2*(2*q1 + 5*q2))/420
The source vector components for node 1 are q_1 and q_2
The source vector components for node 2 are q_3 and q_4
The source vector components for node 1 are q_5 and q_6
```

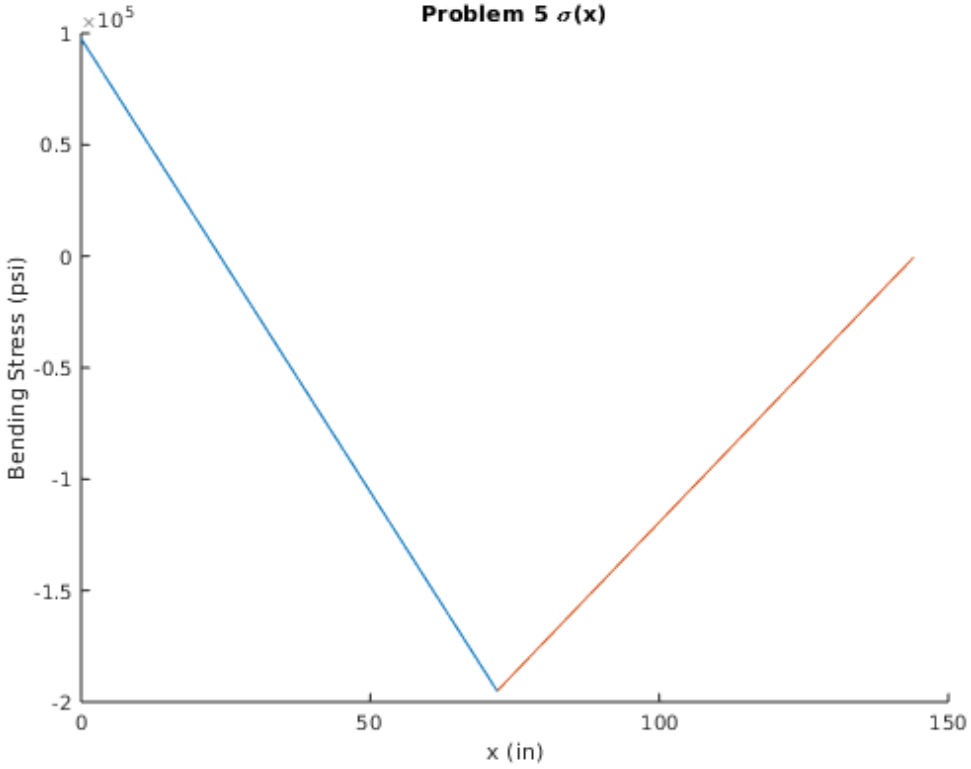
Problem 5

```
clear;
syms xbar x
L = 144;
h = L/2;
E = 30e6;
b = 3;
c = 2;
I = b*(2*c)^3/12;
EI = E*I;
q0 = 50;

phi(1) = 1 - 3.*(xbar/h).^2 + 2.*(xbar/h).^2;
phi(2) = -xbar.*(1-xbar/h).^2;
phi(3) = 3.*(xbar/h).^2 - 2.*(xbar/h).^3;
phi(4) = -xbar.*((xbar/h).^2 - (xbar/h));

q1 = zeros(4,1);
q2 = zeros(4,1);
for ii = 1:4
    q1(ii) = int(q0*phi(ii),xbar,0,h);
    q2(ii) = int(q0*phi(ii),xbar,0,h);
end
q = [q1(1); q1(2); q1(3) + q2(1); q1(4) + q2(2); q2(3); q2(4)];

k = @(ii,jj) int(EI*diff(diff(phi(ii)))*diff(diff(phi(jj))),xbar,0,h);
K1 = zeros(4);
K2 = zeros(4);
for ii = 1:4
    for jj = 1:4
        K1(ii,jj) = k(ii,jj);
        K2(ii,jj) = k(ii,jj);
    end
end
```

```
Kg = zeros(6);
for ii = 1:4
    for jj = 1:4
        Kg(ii,jj) = K1(ii,jj);
    end
end

for ii = 1:4
    for jj = 1:4
        Kg(ii+2,jj+2) = Kg(ii+2,jj+2) + K2(ii,jj);
    end
end

Qtop = Kg(1:3,1:3)*[0;0;0]-q(1:3);
Q = [Qtop; 0; 0; 0];
DELbot = inv(Kg(4:6,4:6))*(q(1:3)+Q(4:6));
DEL = [0;0;0;DELbot];

w1 = 0;
w2 = 0;
for ii = 1:4
    w1 = w1 + DEL(ii).*phi(ii);
    w2 = w2 + DEL(ii+2).*phi(ii);
end
w1 = simplify(w1);
w2 = simplify(w2);
M1 = EI*diff(diff(w1));
M2 = EI*diff(diff(w2));
sigma1 = M1*c/I;
sigma2 = M2*c/I;
fprintf("\nProblem5\n")
fprintf("Q_equil force at left: %f lb\n", Q(1))
fprintf("Q_equil moment at left: %f in*lb\n", Q(2))
fprintf("Q_equil force at right: %f lb\n", Q(5))
fprintf("Q_equil moment at right: %f in*lb\n", Q(6))
Qdef(1) = subs(diff(M1),xbar,0);
Qdef(2) = subs(M1,xbar,0);
Qdef(3) = -subs(diff(M2),xbar,L/2);
Qdef(4) = -subs(M2,xbar,L/2);
fprintf("Q_def force at left: %f lb\n", Qdef(1))
fprintf("Q_def moment at left: %f in*lb\n", Qdef(2))
fprintf("Q_def force at right: %f lb\n", Qdef(3))
fprintf("Q_def moment at right: %f in*lb\n", Qdef(4))

xvec1 = linspace(0,L/2);
xvec2 = linspace(L/2,L);
figure
hold on
title("Problem 5 w(x)")
plot(xvec1, subs(w1, xbar, xvec1))
plot(xvec2, subs(w2, xbar, xvec2-L/2))
xlabel("x (in)")
ylabel("Vertical displacement (in)")
hold off
```

```
figure
hold on
title("Problem 5 \sigma(x)")
plot(xvec1, subs(sigma1, xbar, xvec1))
plot(xvec2, subs(sigma2, xbar, xvec2-L/2))
xlabel("x (in)")
ylabel("Bending Stress (psi)")
hold off

fprintf("vertical dispalacement for 0<=x<=L/2 is w(x)=%s\n",
 subs(w1,xbar,x))
fprintf("vertical dispalacement for L/2<=x<=L is w(x)=%s\n",
 simplify(subs(w2,xbar,x-L/2)))
fprintf("bending stress for 0<=x<=L/2 is sigma(x)=%s\n",
 subs(sigma1,xbar,x))
fprintf("bending stress for L/2<=x<=L is sigma(x)=%s\n",
 simplify(subs(sigma2,xbar,x-L/2)))


Problem5
Q_equil force at left: -2400.000000 lb
Q_equil moment at left: 21600.000000 in*lb
Q_equil force at right: 0.000000 lb
Q_equil moment at right: 0.000000 in*lb
Q_def force at left: -32537.500000 lb
Q_def moment at left: 780900.000000 in*lb
Q_def force at right: -21600.000000 lb
Q_def moment at right: 4200.000000 in*lb
vertical dispalacement for 0<=x<=L/2 is w(x)=-(1406744379605447*x^2*(x
 - 72))/124515522497539473408
vertical dispalacement for L/2<=x<=L is w(x)=((x -
 72)*(157589958160947587 39*x^2 - 5682431241353511222624*x +
 204378416738933075165952))/2101199442145978613760000
bending stress for 0<=x<=L/2 is
 sigma(x)=1099019046566755468 75/1125899906842624 -
 (1099019046566755468 75*x)/27021597764222976
bending stress for L/2<=x<=L is
 sigma(x)=(196987447701184484 2375*x)/729583139634020352 -
 131502294369450884 4875/3377699720527872
```


Problem 5 w(x)
Vertical displacement (in)
x (in)
2
0
-2
-4
-6
-8
-10
0
50
100
150


Problem 5 σ(x)
×10^5
Bending Stress (psi)
x (in)
1
0.5
0
-0.5
-1
-1.5
-2
0
50
100
150

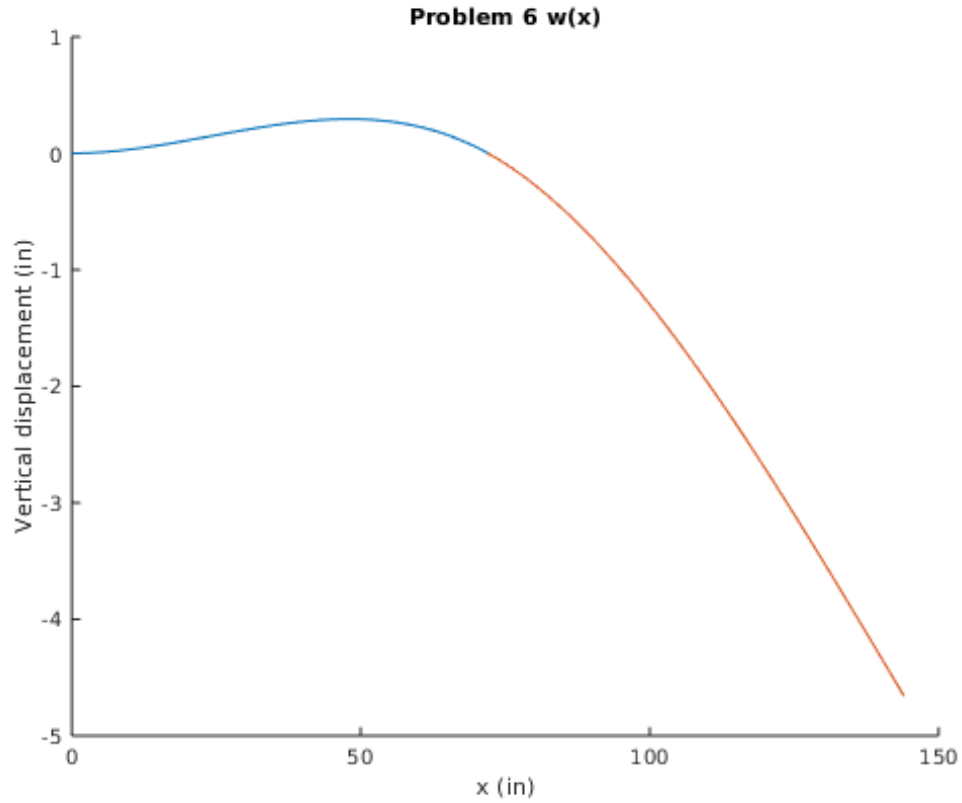
Problem 6

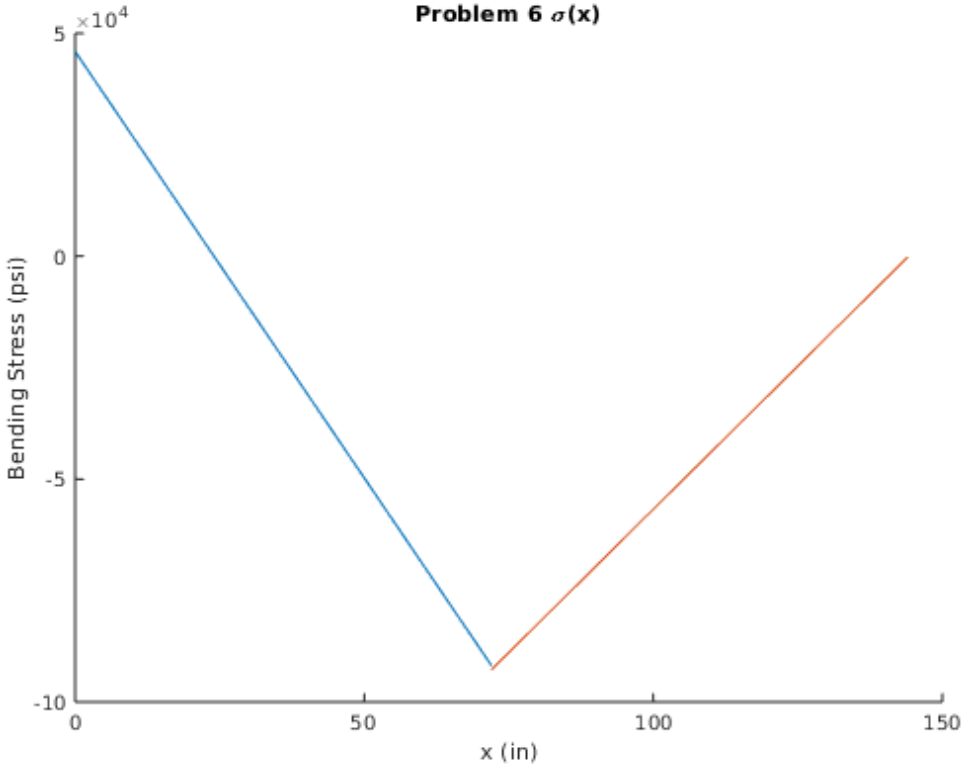
```
clear;
syms xbar x
L = 144;
h = L/2;
E = 30e6;
b = 3;
c = 2;
I = b*(2*c)^3/12;
EI = E*I;

q0 = 50;
Ks = 2000;
M0 = 10000;
F0 = 2000;

phi(1) = 1 - 3.*(xbar/h).^2 + 2.*(xbar/h).^2;
phi(2) = -xbar.*(1-xbar/h).^2;
phi(3) = 3.*(xbar/h).^2 - 2.*(xbar/h).^3;
phi(4) = -xbar.*((xbar/h).^2 - (xbar/h));

q1 = zeros(4,1);
q2 = zeros(4,1);
for ii = 1:4
    q1(ii) = int(q0*phi(ii),xbar,0,h);
    q2(ii) = 0;
end
q = [q1(1); q1(2); q1(3) + q2(1); q1(4) + q2(2); q2(3); q2(4)];

k = @(ii,jj) int(EI*diff(diff(phi(ii)))*diff(diff(phi(jj))),xbar,0,h);
K1 = zeros(4);
K2 = zeros(4);
for ii = 1:4
    for jj = 1:4
        K1(ii,jj) = k(ii,jj);
        K2(ii,jj) = k(ii,jj);
    end
end
K2(3,3) = K2(3,3) + Ks;
Kg = zeros(6);
for ii = 1:4
    for jj = 1:4
        Kg(ii,jj) = K1(ii,jj);
    end
end

for ii = 1:4
    for jj = 1:4
        Kg(ii+2,jj+2) = Kg(ii+2,jj+2) + K2(ii,jj);
    end
end
```

```
Qtop = Kg(1:3,1:3)*[0;0;0]-q(1:3);
Q = [Qtop; -M0; F0; 0];
DELbot = inv(Kg(4:6,4:6))*(q(1:3)+Q(4:6));
DEL = [0;0;0;DELbot];
Q(5) = Q(5) - Ks*DEL(5);

w1 = 0;
w2 = 0;
for ii = 1:4
    w1 = w1 + DEL(ii).*phi(ii);
    w2 = w2 + DEL(ii+2).*phi(ii);
end
w1 = simplify(w1);
w2 = simplify(w2);
M1 = EI*diff(diff(w1));
M2 = EI*diff(diff(w2));
sigma1 = M1*c/I;
sigma2 = M2*c/I;
fprintf("\nProblem 6\n")
fprintf("Q_equil force at left: %f lb\n", Q(1))
fprintf("Q_equil moment at left: %f in*lb\n", Q(2))
fprintf("Q_equil force at right: %f lb\n", Q(5))
fprintf("Q_equil moment at right: %f in*lb\n", Q(6))
Qdef(1) = subs(diff(M1),xbar,0);
Qdef(2) = subs(M1,xbar,0);
Qdef(3) = -subs(diff(M2),xbar,L/2);
Qdef(4) = -subs(M2,xbar,L/2);
fprintf("Q_def force at left: %f lb\n", Qdef(1))
fprintf("Q_def moment at left: %f in*lb\n", Qdef(2))
fprintf("Q_def force at right: %f lb\n", Qdef(3))
fprintf("Q_def moment at right: %f in*lb\n", Qdef(4))

xvec1 = linspace(0,L/2);
xvec2 = linspace(L/2,L);
figure
hold on
plot(xvec1, subs(w1, xbar, xvec1))
plot(xvec2, subs(w2, xbar, xvec2-L/2))
title("Problem 6 w(x)")
xlabel("x (in)")
ylabel("Vertical displacement (in)")
hold off
figure
hold on
plot(xvec1, subs(sigma1, xbar, xvec1))
plot(xvec2, subs(sigma2, xbar, xvec2-L/2))
title("Problem 6 \sigma(x)")
xlabel("x (in)")
ylabel("Bending Stress (psi)")
hold off

fprintf("vertical dispalacement for 0<=x<=L/2 is w(x)=%s\n",
 subs(w1,xbar,x))
```

```
fprintf("vertical dispalacement for L/2<=x<=L is w(x)=%s\n",
 simplify(subs(w2,xbar,x-L/2)))
fprintf("bending stress for 0<=x<=L/2 is sigma(x)=%s\n",
 subs(sigma1,xbar,x))
fprintf("bending stress for L/2<=x<=L is sigma(x)=%s\n",
 simplify(subs(sigma2,xbar,x-L/2)))
```

```
Problem 6
Q_equil force at left: -2400.000000 lb
Q_equil moment at left: 21600.000000 in*lb
Q_equil force at right: 11316.925336 lb
Q_equil moment at right: 0.000000 in*lb
Q_def force at left: -15303.778663 lb
Q_def moment at left: 367290.687919 in*lb
Q_def force at right: -10283.074664 lb
Q_def moment at right: 1800.000000 in*lb
vertical dispalacement for 0<=x<=L/2 is w(x)=-(294067592044577*x^2*(x
 - 72))/55340232221128654848
vertical dispalacement for L/2<=x<=L is w(x)=((x -
 72)*(48015090552099481*x^2 - 17310646992061559232*x +
 627015879496690373376))/1344767642973426312806 4
bending stress for 0<=x<=L/2 is
 sigma(x)=2067662756563432031 25/4503599627370496 -
 (68922091885447734375*x)/36028797018963968
bending stress for L/2<=x<=L is
 sigma(x)=(375117894938277195 3125*x)/2918332558536081408 -
 250382589600365570312 5/13510798882111488
```


Problem 6 w(x)
Vertical displacement (in)
x (in)
1
0
-1
-2
-3
-4
-5
0
50
100
150


Problem 6 σ(x)
×10^4
Bending Stress (psi)
x (in)
5
0
-5
-10
0
50
100
150

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