# ECON 512
# Homework 1

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## Problem 1

Code:

```
X=[1 1.5 3 4 5 7 9 10];
Y1=-1+0.5*X;
Y2=-2+0.5*X.^2;
plot(X,Y1,X,Y2);
legend('Y1=-1+0.5X','Y2=-2+0.5X^2')
```

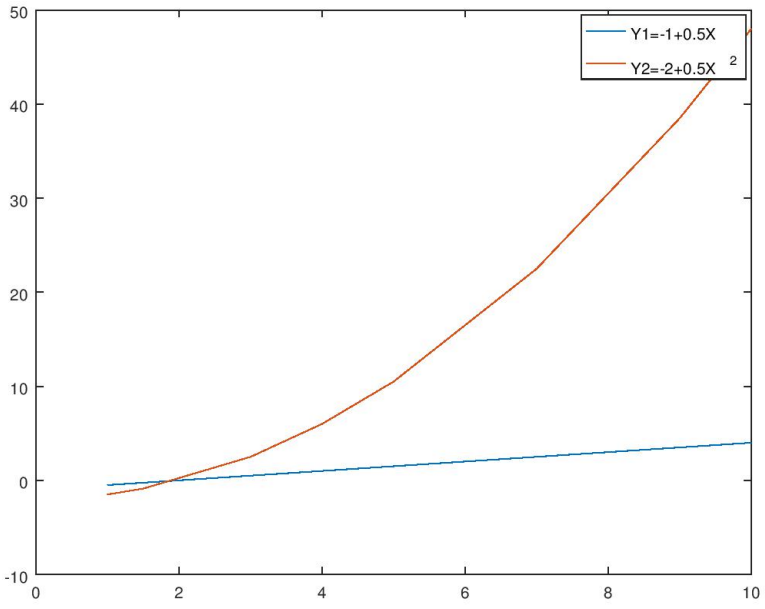


Figure 1

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## Problem 2

Code:

```
>> X=linspace(-10,20,200)';
>> sum(X)
ans =  1000.0
```

## Problem 3

- ```
  >> A=[2 4 6; 1 7 5; 3 12 4];
  >> b=[-2;3;10];
  >> C=A'*b
  C =
  29
  133
  43
  ```

- ```
  >> AA=A'*A;
  >> D=AA\b
  D =
  -3.25055
  0.39609
  0.80369
  ```

- ```
  >> Ab=A'*b;
  >> E=sum(Ab)
  E =  205
  ```

- ```
  >> F=A;
  >> F(:,3)=[];
  >> F(2,:)=[];
  >> F
  F =
  2    4
  3   12
  ```

- ```
  >> x=A\b
  x =
  -0.16216
  1.24324
  -1.10811
  ```
  ```

## Problem 4

```
>> B=blkdiag(A,A,A,A,A)
B =
2    4    6    0    0    0    0    0    0    0    0    0    0    0    0
1    7    5    0    0    0    0    0    0    0    0    0    0    0    0
3   12    4    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    2    4    6    0    0    0    0    0    0    0    0    0
0    0    0    1    7    5    0    0    0    0    0    0    0    0    0
0    0    0    3   12    4    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    2    4    6    0    0    0    0    0    0
0    0    0    0    0    0    1    7    5    0    0    0    0    0    0
0    0    0    0    0    0    3   12    4    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    2    4    6    0    0    0
0    0    0    0    0    0    0    0    0    1    7    5    0    0    0
0    0    0    0    0    0    0    0    0    3   12    4    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    2    4    6
0    0    0    0    0    0    0    0    0    0    0    0    1    7    5
0    0    0    0    0    0    0    0    0    0    0    0    3   12    4
```

## Problem 5

```
>> A=normrnd(10,5,[5,3]);
>> [n,m]=size(A);
>> for i=1:n
for j=1:m
if A(i,j)<10
A(i,j)=0;
else
A(i,j)=1;
end
end
end
>> A
A =
1   0   0
0   0   0
0   0   0
1   0   0
1   1   1
```

## Problem 6

```
>> data0=csvread('datahw1.csv');
>> [numr,numc]=size(data0);
>> data1=ones(numr,4);
>> data2=zeros(numr,1);
>> for i=1:numr
data1(i,2)=data0(i,3);
data1(i,3)=data0(i,4);
data1(i,4)=data0(i,6);
data2(i,1)=data0(i,5);
end
>> XX=data1'*data1;
% estimated coefficients
>> betahat=XX\data1'*data2
betahat =
0.081731
0.120132
0.139925
0.029492
>> err2hat=sum((data2-data1*betahat)'*(data2-data1*betahat))/(numr-4)
err2hat =  0.031871
>> varbetahat=XX\(err2hat*eye(4));
% Standard Deviation
>> stdbetahat=sqrt(varbetahat)
stdbetahat =
0.016729 + 0.000000i  0.003911 + 0.000000i  0.007567 + 0.000000i  0.000000 + 0.005405i
0.003911 + 0.000000i  0.006324 + 0.000000i  0.000000 + 0.003684i  0.000000 + 0.001671i
0.007567 + 0.000000i  0.000000 + 0.003684i  0.008539 + 0.000000i  0.000000 + 0.002573i
0.000000 + 0.005405i  0.000000 + 0.001671i  0.000000 + 0.002573i  0.001784 + 0.000000i
```