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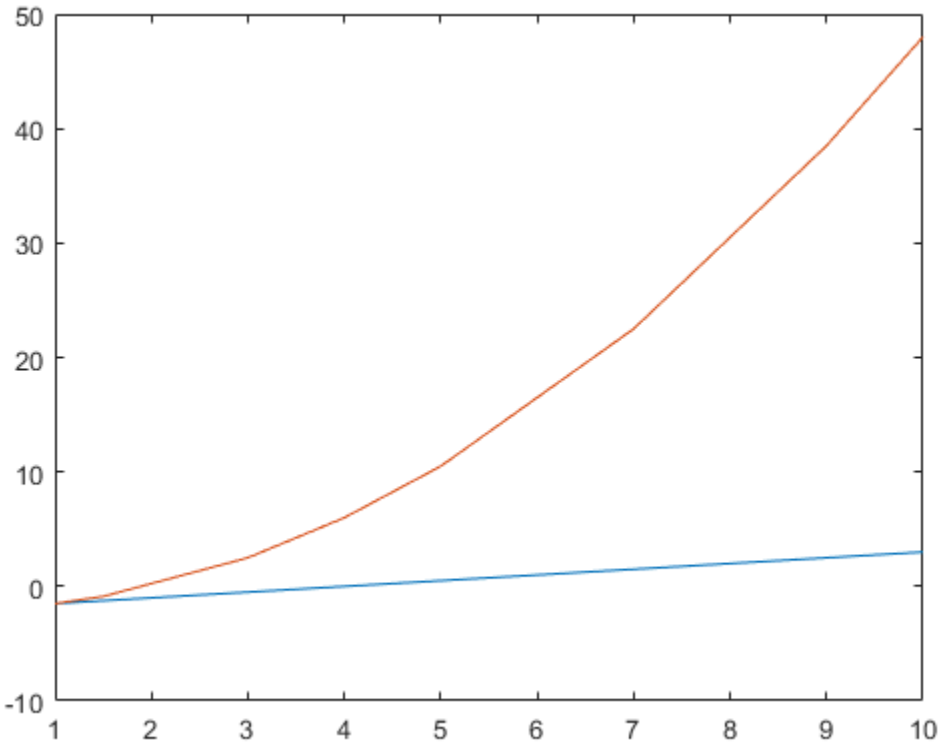
```
% HW1
% Kippeum Lee
```

Q1

```
X = [1,1.5,3,4,5,7,9,10];
X

% generate Y1 and Y2
Y1 = -2 + 0.5*X;
Y2 = -2 + 0.5*(X.^2);
Y1
Y2

% plot Y1 and Y2 against X
figure
plot(X,Y1,X,Y2)
```

```
X =

  Columns 1 through 7

    1.0000    1.5000    3.0000    4.0000    5.0000    7.0000    9.0000

  Column 8

   10.0000


Y1 =

  Columns 1 through 7

   -1.5000   -1.2500   -0.5000         0    0.5000    1.5000    2.5000

  Column 8

    3.0000
```

```
Y2 =

  Columns 1 through 7

   -1.5000   -0.8750    2.5000    6.0000   10.5000   22.5000   38.5000

  Column 8

   48.0000
```



Q2

```
% generate X
X = linspace(-10,20,200)';
X

% sum of X
sum = sum(X);
sum
```

```
X =

  -10.0000
   -9.8492
```

```
-9.6985
-9.5477
-9.3970
-9.2462
-9.0955
-8.9447
-8.7940
-8.6432
-8.4925
-8.3417
-8.1910
-8.0402
-7.8894
-7.7387
-7.5879
-7.4372
-7.2864
-7.1357
-6.9849
-6.8342
-6.6834
-6.5327
-6.3819
-6.2312
-6.0804
-5.9296
-5.7789
-5.6281
-5.4774
-5.3266
-5.1759
-5.0251
-4.8744
-4.7236
-4.5729
-4.4221
-4.2714
-4.1206
-3.9698
-3.8191
-3.6683
-3.5176
-3.3668
-3.2161
-3.0653
-2.9146
-2.7638
-2.6131
-2.4623
-2.3116
-2.1608
-2.0101
-1.8593
-1.7085
```

```
-1.5578
-1.4070
-1.2563
-1.1055
-0.9548
-0.8040
-0.6533
-0.5025
-0.3518
-0.2010
-0.0503
 0.1005
 0.2513
 0.4020
 0.5528
 0.7035
 0.8543
 1.0050
 1.1558
 1.3065
 1.4573
 1.6080
 1.7588
 1.9095
 2.0603
 2.2111
 2.3618
 2.5126
 2.6633
 2.8141
 2.9648
 3.1156
 3.2663
 3.4171
 3.5678
 3.7186
 3.8693
 4.0201
 4.1709
 4.3216
 4.4724
 4.6231
 4.7739
 4.9246
 5.0754
 5.2261
 5.3769
 5.5276
 5.6784
 5.8291
 5.9799
 6.1307
 6.2814
 6.4322
```

6.5829
6.7337
6.8844
7.0352
7.1859
7.3367
7.4874
7.6382
7.7889
7.9397
8.0905
8.2412
8.3920
8.5427
8.6935
8.8442
8.9950
9.1457
9.2965
9.4472
9.5980
9.7487
9.8995
10.0503
10.2010
10.3518
10.5025
10.6533
10.8040
10.9548
11.1055
11.2563
11.4070
11.5578
11.7085
11.8593
12.0101
12.1608
12.3116
12.4623
12.6131
12.7638
12.9146
13.0653
13.2161
13.3668
13.5176
13.6683
13.8191
13.9698
14.1206
14.2714
14.4221
14.5729

```
   14.7236
   14.8744
   15.0251
   15.1759
   15.3266
   15.4774
   15.6281
   15.7789
   15.9296
   16.0804
   16.2312
   16.3819
   16.5327
   16.6834
   16.8342
   16.9849
   17.1357
   17.2864
   17.4372
   17.5879
   17.7387
   17.8894
   18.0402
   18.1910
   18.3417
   18.4925
   18.6432
   18.7940
   18.9447
   19.0955
   19.2462
   19.3970
   19.5477
   19.6985
   19.8492
   20.0000


sum =

        1000
```

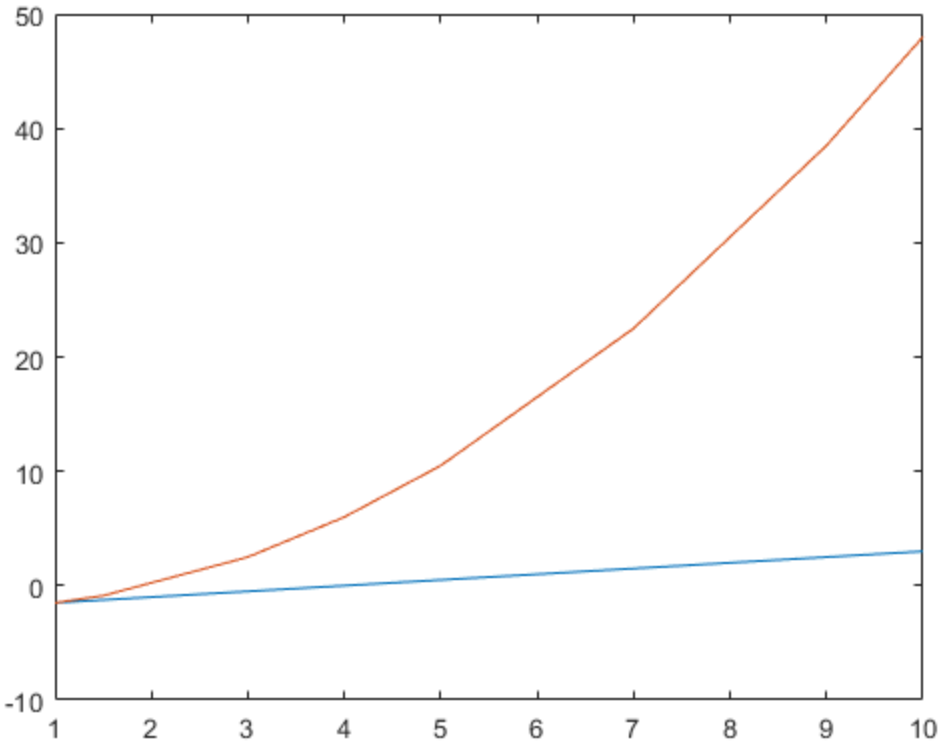
Q3

```
A = [ 2 4 6 ; 1 7 5 ; 3 12 4 ];
b = [ -2 3 10 ]';

C = A'*b;
D = (A'*A)\b;
C
D
```

```
E = 0;
for i = 1:3
    for j = 1:3
        E = E + A(i,j)*b(i,1)
    end
end
E

F = A;
F(2,:) = [];
F(:,3) = [];
F

x = A\b;
x
```

```
C =

    29
   133
    43


D =

   -3.2505
    0.3961
    0.8037


E =

    -4


E =

   -12


E =

   -24


E =

   -21


E =

     0
```

```
E =

    15


E =

    45


E =

   165


E =

   205


E =

   205


F =

     2     4
     3    12


x =

   -0.1622
    1.2432
   -1.1081
```



Q4

```
B = blkdiag(A,A,A,A,A);
B
```

```
B =

  Columns 1 through 13

     2     4     6     0     0     0     0     0     0     0     0
0     0
     1     7     5     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     2     4     6     0     0     0     0     0
0     0
     0     0     0     1     7     5     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     2     4     6     0     0
0     0
     0     0     0     0     0     0     1     7     5     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     2     4
 6     0
    0     0     0     0     0     0     0     0     0     1     7
 5     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     2
    0     0     0     0     0     0     0     0     0     0     0
 0     1
    0     0     0     0     0     0     0     0     0     0     0
 0     3

  Columns 14 through 15

    0     0
    0     0
    0     0
    0     0
    0     0
    0     0
    0     0
    0     0
    0     0
    0     0
    0     0
    0     0
    0     0
    4     6
    7     5
   12     4
```

05

```
G = normrnd(10,5,[5,3]);
A = G;
A

for i = 1:5
    for j = 1:3
        if A(i,j) < 10
            A(i,j) = 0
        else
            A(i,j) = 1
        end
    end
end
A


A =
```

```
    8.9752   13.3575   15.1735
    9.3793    3.9626   13.6344
   17.4485   13.5862    8.4828
   17.0452   18.1512   11.4694
   17.0860   12.4445    6.0636


A =

         0   13.3575   15.1735
    9.3793    3.9626   13.6344
   17.4485   13.5862    8.4828
   17.0452   18.1512   11.4694
   17.0860   12.4445    6.0636


A =

         0    1.0000   15.1735
    9.3793    3.9626   13.6344
   17.4485   13.5862    8.4828
   17.0452   18.1512   11.4694
   17.0860   12.4445    6.0636


A =

         0    1.0000    1.0000
    9.3793    3.9626   13.6344
   17.4485   13.5862    8.4828
   17.0452   18.1512   11.4694
   17.0860   12.4445    6.0636


A =

         0    1.0000    1.0000
         0    3.9626   13.6344
   17.4485   13.5862    8.4828
   17.0452   18.1512   11.4694
   17.0860   12.4445    6.0636


A =

         0    1.0000    1.0000
         0         0   13.6344
   17.4485   13.5862    8.4828
   17.0452   18.1512   11.4694
   17.0860   12.4445    6.0636


A =
```

```
         0    1.0000    1.0000
         0         0    1.0000
   17.4485   13.5862    8.4828
   17.0452   18.1512   11.4694
   17.0860   12.4445    6.0636


A =

         0    1.0000    1.0000
         0         0    1.0000
    1.0000   13.5862    8.4828
   17.0452   18.1512   11.4694
   17.0860   12.4445    6.0636


A =

         0    1.0000    1.0000
         0         0    1.0000
    1.0000    1.0000    8.4828
   17.0452   18.1512   11.4694
   17.0860   12.4445    6.0636


A =

         0    1.0000    1.0000
         0         0    1.0000
    1.0000    1.0000         0
   17.0452   18.1512   11.4694
   17.0860   12.4445    6.0636


A =

         0    1.0000    1.0000
         0         0    1.0000
    1.0000    1.0000         0
    1.0000   18.1512   11.4694
   17.0860   12.4445    6.0636


A =

         0    1.0000    1.0000
         0         0    1.0000
    1.0000    1.0000         0
    1.0000    1.0000   11.4694
   17.0860   12.4445    6.0636


A =
```

```
         0    1.0000    1.0000
         0         0    1.0000
    1.0000    1.0000         0
    1.0000    1.0000    1.0000
   17.0860   12.4445    6.0636


A =

         0    1.0000    1.0000
         0         0    1.0000
    1.0000    1.0000         0
    1.0000    1.0000    1.0000
    1.0000   12.4445    6.0636


A =

         0    1.0000    1.0000
         0         0    1.0000
    1.0000    1.0000         0
    1.0000    1.0000    1.0000
    1.0000    1.0000    6.0636


A =

     0     1     1
     0     0     1
     1     1     0
     1     1     1
     1     1     0


A =

     0     1     1
     0     0     1
     1     1     0
     1     1     1
     1     1     0
```

Q6

```
% I imported the datahw1.csv with the name datahw1. I deleted 3
% observations which have blank in their data set. Thus, the size of
% imported data set is 4389

n = 4389;
id = datahw1(:,1);
year = datahw1(:,2);
```

```
export = datahw1(:,3);
rd = datahw1(:,4);
prod = datahw1(:,5);
cap = datahw1(:,6);

y = prod;
one = ones(n,1);
X = [ one export rd cap ];
k = 4;

% OLS estimator
b = (X'*X)\(X'*y);
b

% standard errors
res = y - X*b; % estimate residuals
res2 = res.^2;
cov = (X'*X)\(X'*res2)*(X'*res2)'/(X'*X); % covariance matrix
stderror = diag(cov); % standard errors
tvalue = b./sqrt(stderror); % t values
stderror
```

```
b =

    0.0825
    0.1198
    0.1399
    0.0294


stderror =

    0.0020
    0.0000
    0.0001
    0.0000
```

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