**Homework Set 2**

**Solution**

**Problem 1 (Regression)**

Matlab Code:

X=load(‘Xtrain’);

Y=load(‘Ytrain’);

scatter(X,Y);

f=polyfit(X,Y,3);

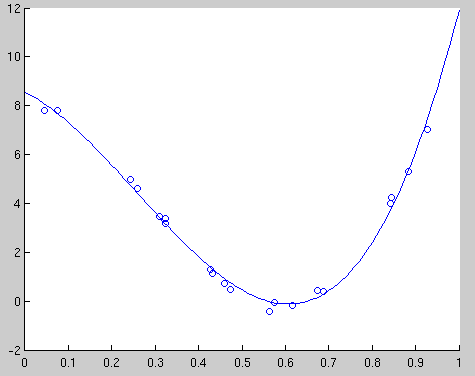
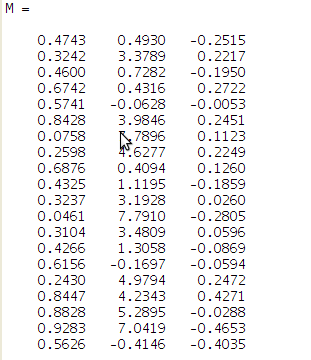
x=0:0.01:1;

y=polyval(f,x);

plot(x,y);

y=polyval(f,X);

M=[X Y Y-y]

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**X Y Error**

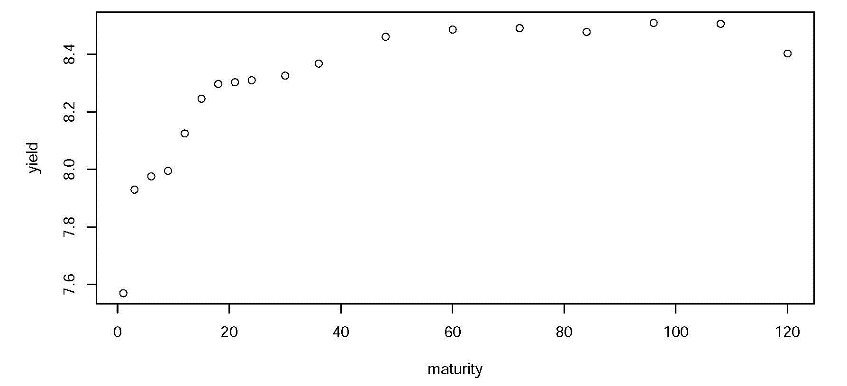
**Problem 2 (Regression)**

Note that 



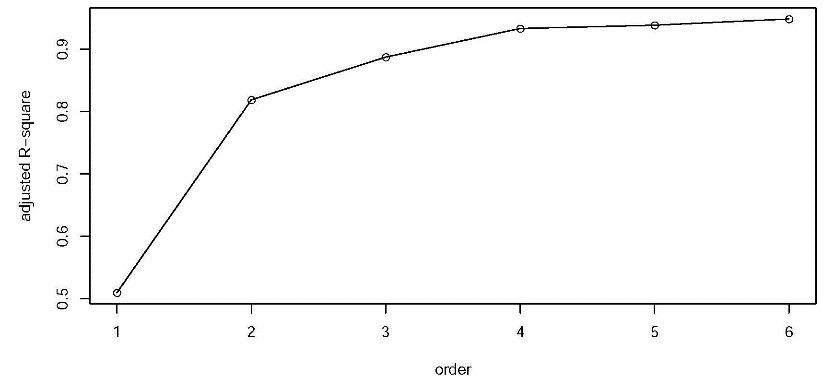
**Problem 3 (Residue analysis)**

1. Generate a scatter plot of the yields vs maturity. Comment on the figures.



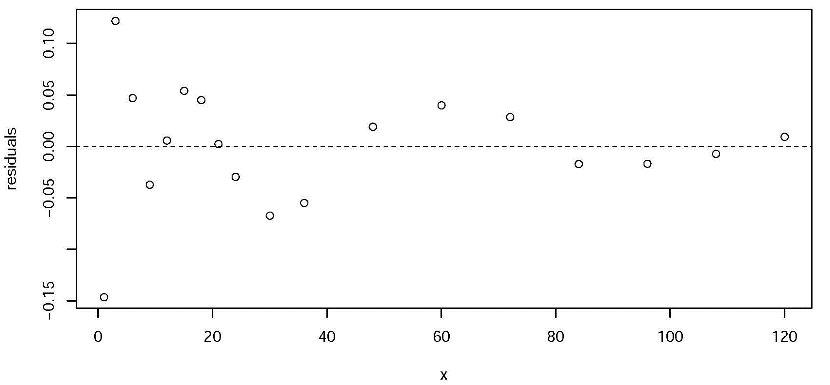
The yield increases as maturity increases when maturity is within about 50 months, and it approaches a stable level afterwards.

1. You want to fit a polynomial regression model to the data. Since you don't know the order you need, you fit six polynomial models, with orders from 1 to 6. Plot the vs the polynomial order . Comment on the result.



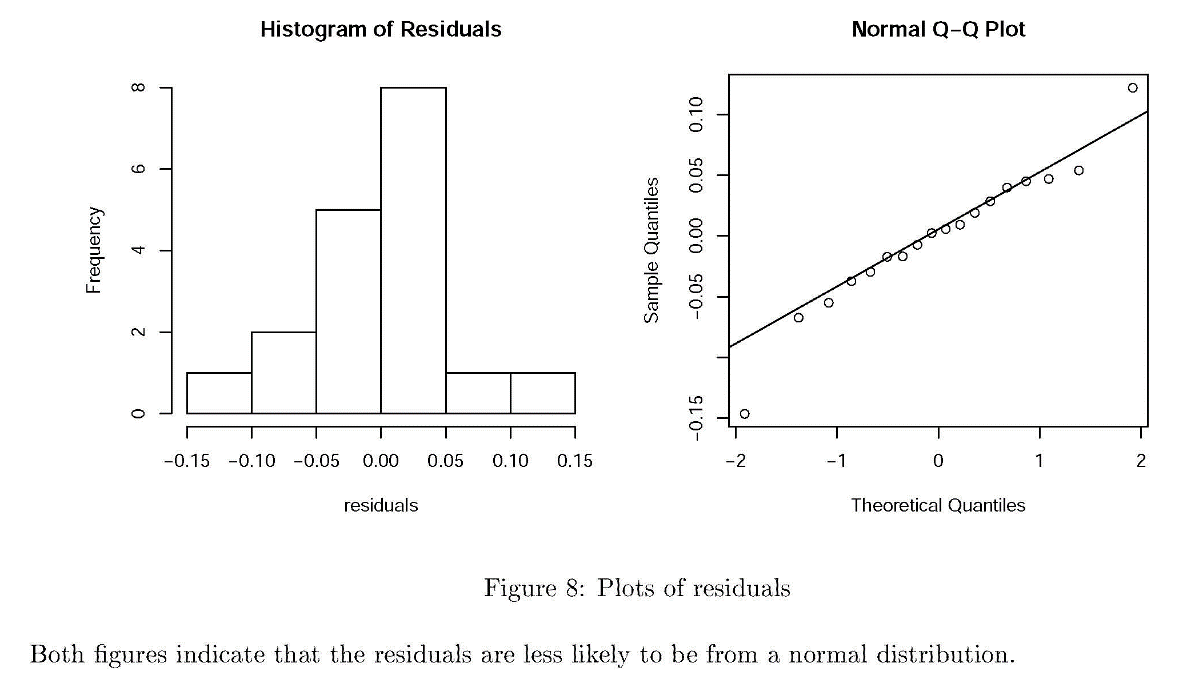
increase very fast as polynomial order increases at the beginning. However it increase slowly after polynomial order is greater than 3. is the highest at order 6, which suggests an order 6 polynomial model.

1. For the 4th-order polynomial model, draw a residual plot (vs maturity). Comment on it.



The residuals are centered around 0. However, for short maturity periods, the residual uctuates more than that of higher maturities.

1. Draw a histogram and a quantile-quantile (Q-Q) plot of the residuals. Comment on it.

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