

CS344 Lab 12 – Linear Analysis

Assigned: 11/10/09

Points: 20

Purpose

The purpose of the lab is to learn how to use the linear model program shown in chapter10 and to perform graphing in Excel.

Process

The linear program from the book appears similar to:

```
program linear
implicit none
integer k,n
real x(500), y(500), sumx, sumy, sumxy, sumxx
real slope, yint, ynew, res, error
data k, sumx, sumy, sumxy, sumxx, error /1,5*0.0/

open(unit=10, file='zone1.dat', status='old')
do while(.true.)
5  read(10,*,end=50) x(k), y(k)
    sumx = sumx + x(k)
    sumy = sumy + y(k)
    sumxy = sumxy+x(k)*y(k)
    sumxx = sumxx + x(k)*x(k)
    k = k+1
enddo
50 n = k-1

    slope = (sumx*sumy - real(n)*sumxy) /
-          (sumx*sumx - real(n)*sumxx)
    yint = (sumx*sumxy - sumxx*sumy)/
-          (sumx*sumx - real(n)*sumxx)

    print 60, slope, yint
60 format(1x,'linearmodel:',5x,
-       'y = ',F8.4,' x + (',F8.4,')')
    print *, 'original      original      estimated      residual'
    print *, 'x              y              y'

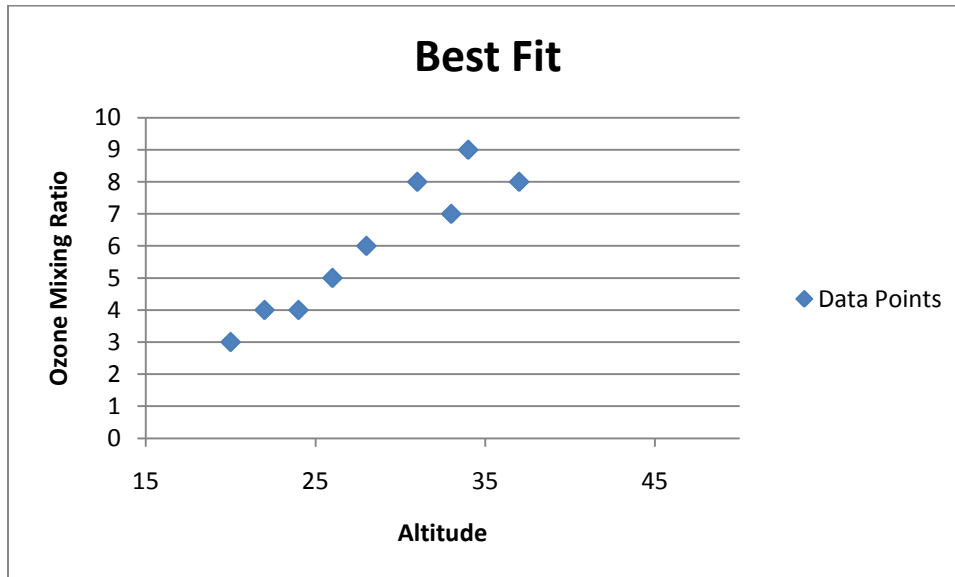
    do 75 k=1,n
        ynew = slope*x(k) + yint
        res = y(k) - ynew
        error = error + res*res
        print 65, x(k), y(k), ynew, res
65  format(1x,F7.2,6X,F7.2,6X,F7.2,7X,F7.2)
75 continue
    print *
    print 80, error/real(n)
80 format(1X,'average squared error = ',F7.4)
    pause
end
```

Use the data from page 460.

Rework the code so that the program linear calls to subroutines:

- GetData – Reads the data for an input file and computes the key sums
- DisplayData – Displays the results similar to the format shown on page 463

In Excel, use the original data points and produce a chart in Excel that is similar to the following:



Turn in a copy of your FORTRAN code, the sample output and a copy of your chart.