**Homework Assignment for Scipy**

1. A menu driven program.

The program should initially ask the user for the degree of the polynomial to be generated.

The coefficients of the polynomial is to be random integers in the range -10 to 10. Once the user enters the value for degree of polynomial, the following menu should be displayed to perform various operations:

1. Display the polynomial equation and the array of coefficients
2. Display the differential of the polynomial equation
3. Display the integral of polynomial equation
4. Plot the polynomial equation and integral of the polynomial for the data range [-100,100] in two separate windows
5. Find the area under the curve for range [-50, 50]

*The axis of the graphs generated should be properly labeled and the graph should be titled*

1. For the given data set of salary, (import from the CSV file attached) find out the descriptive statistics for salary, experience, and total experience. Plot a histogram for these data.

Plot scatter plots of Salary vs Total Experience. Fit different curves based on your intuition to this scatter plot to find the relationship between Salary and Total Experience. Determine the mean of sum of squared residuals for each curve fitted and choose the curve with the lowest mean SSR. Mean of SSR = sum((func(xdata, \*prm) – ydata)\*\*2)/xdata.size .

1. For the given matrix find out determinant, inverse, transpose, and eigen pairs

[1 8 -9 7 5

0 1 0 4 4

0 0 1 2 5

0 0 0 1 -5

0 0 0 0 1]

1. Generate surface plot for a Bessel function (can be found under scipy special functions). The input array for Bessel function is derived using the function **sqrt(X\*\*2 + Y\*\*2).** X and Y are array with values between -5 and 5 with an increment value of 0.25.

Taking the same input array and X and Y values, plot a surface plot for Struve function, modstruve function, and Parabolic cylinder function D.

5) Solve the following linear programming problem using *linprog*. Now vary the constraint on the resource represented by the second and third constraints together in a range 0 to 10. Observe the effect on the objective function value and make a surface plot.

