1. Polynomial interpolation

a. (10%) Draw a flow chart to illustrate polynomial interpolation based on Matlab statements, poly and polyval.

b. (10%) Let x=[-1 1 3 5] and y=[105 -15 9 -15]. Let p denote a polynomial that pass four points determined by x and y. Write a matlab function to determine p for given x and y.

2. (10%) Let $x=[x_1\ x_2\ \ldots\ x_n]$ and $y=[y_1\ y_2\ \ldots\ y_n]$. Assume $y_i = ax_i + b + e_i$.

a. Express the mean square error, E(a,b), of approximating y_i by $ax_i + b$ for all i.

b. Derive the normal equation of minimizing E(a,b)

3. Let $x=[x_1\ x_2\ \ldots\ x_n]$ and $y=[y_1\ y_2\ \ldots\ y_n]$. Assume $y_i = ax^2_i + bx_i + c + e_i$.

a. (5%) Express the mean square error, E(a,b,c), of approximating y_i by $ax_i + b$ for all i.

b. (5%) Derive the normal equation of minimizing E(a,b,c)

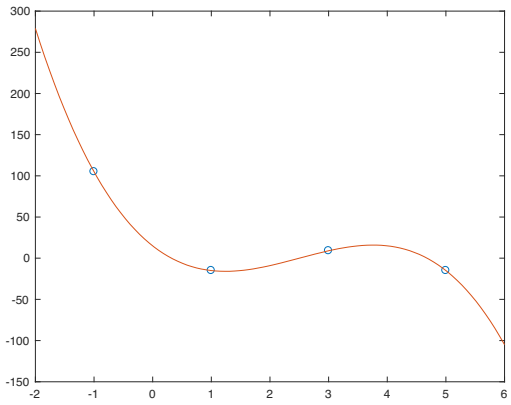
c. (10%)Draw a flow chart to illustrate minimizing E(a,b,c) with respect to a and b for given x and y

d. (10%) Write a matlab function to implement the flow chart.

4. (20%) Let x=[-1 1 3 5] and y=[105 -15 9 -15]. Let p denote a polynomial well interpolating x and y.

a. Apply matlab function in problem 1 to find p. Checked by_____ time:

b. Draw the following figure. Checked by_____time:



5. (20%) Let a=3, b=-2 and c=1.

a. Use the matlab function in 3 to find a, b and c. Checked by_____time:

b. Use the matlab function in 3 to plot a similar figure. Checked by_____time: