

1 Hands-on–Interpolation and Curve Fitting with MATLAB I

1. For the given data points;

x	y
2	2.12
4	2.24
6	2.68
10	3.56

- Study this example in MATLAB; *Start* \Rightarrow *Toolboxes* \Rightarrow *CurveFitting* \Rightarrow *Curve Fitting Tool*.
- Fit to linear polynomial, quadratic polynomial, cubic polynomial.
- For each polynomial;
 - interpolate for $x = 5$
 - extrapolate for $x = 12$
- Compare your results, which one is the best? Why?

2. For the given data points;

x	Y
1	1.3
2	3.5
3	4.2
4	5.0
5	7.0
6	8.8
7	10.1
8	12.5
9	13.0
10	15.6

- i Plot it (such as `plot(x,Y,'o')`).
- ii The graph suggest a linear relationship.

$$y = ax + b$$

values for the parameters, a and b , can be obtained from the plot.

iii Write a MATLAB code that calculates each summation;

$$\begin{array}{ccc} \sum x_i^2 & \sum x_i & \sum x_i Y_i \\ \sum x_i & N & \sum Y_i \end{array}$$

All the summations are from $i = 1$ to $i = N$.

iv Then it is obtained as

$$\begin{array}{rcl} a \sum x_i^2 + b \sum x_i & = & \sum x_i Y_i \\ a \sum x_i + bN & = & \sum Y_i \end{array}$$

Solving these equations simultaneously gives the values for slope and intercept a and b . Now, we have a function in the form;

$$y = ax + b$$

v Plot them (such as `plot(x,y,x,Y,'o')`).