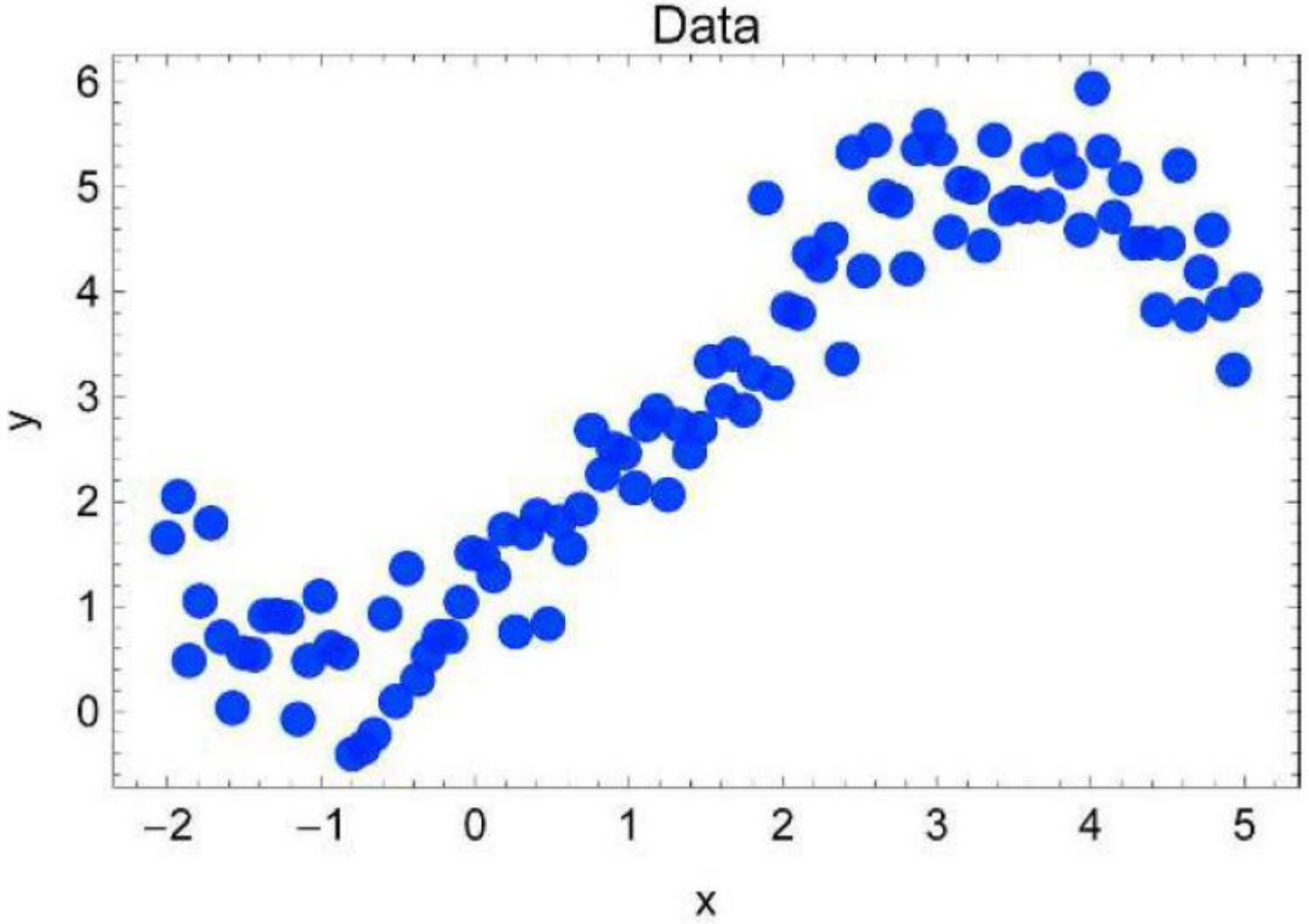
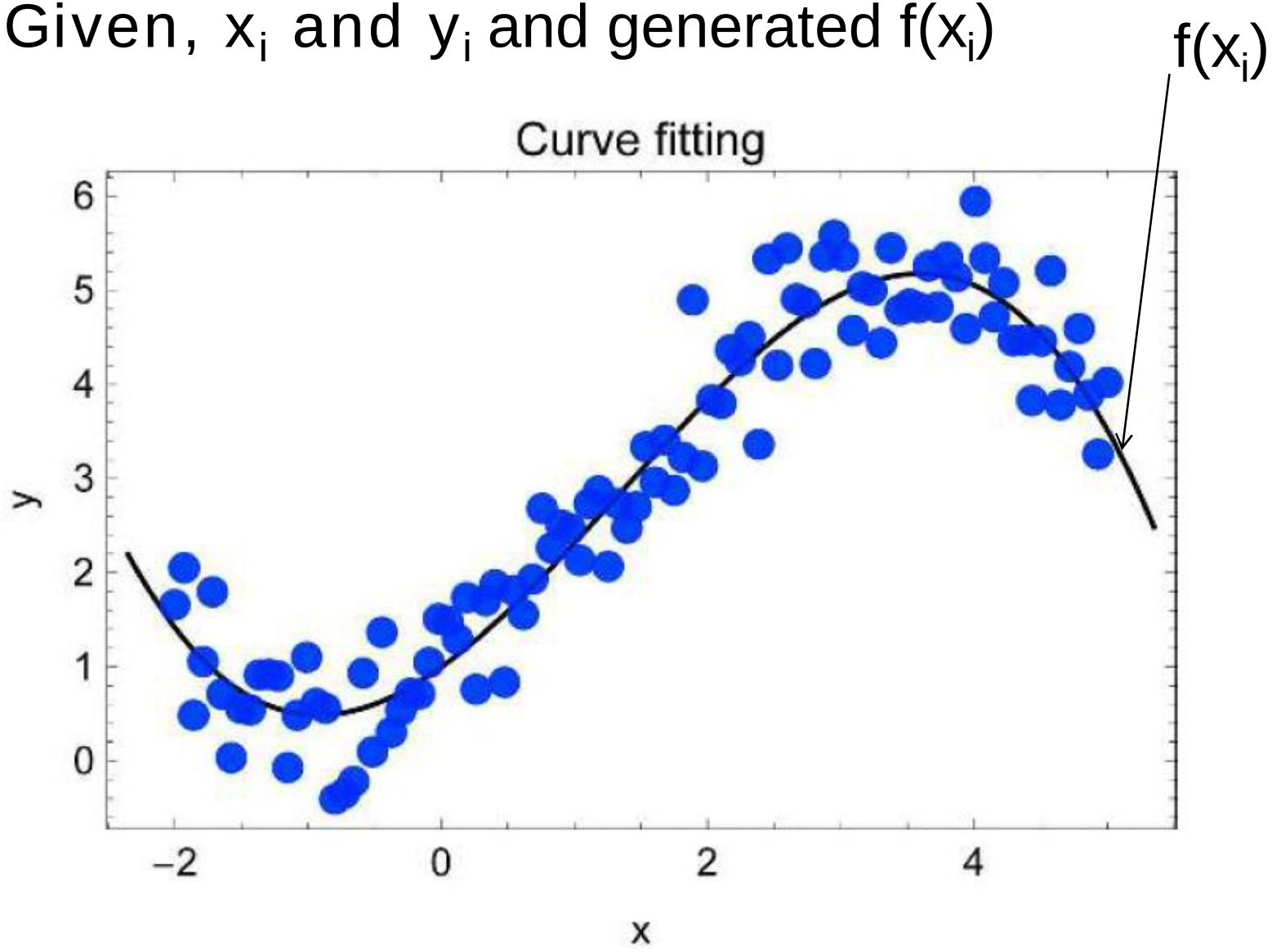
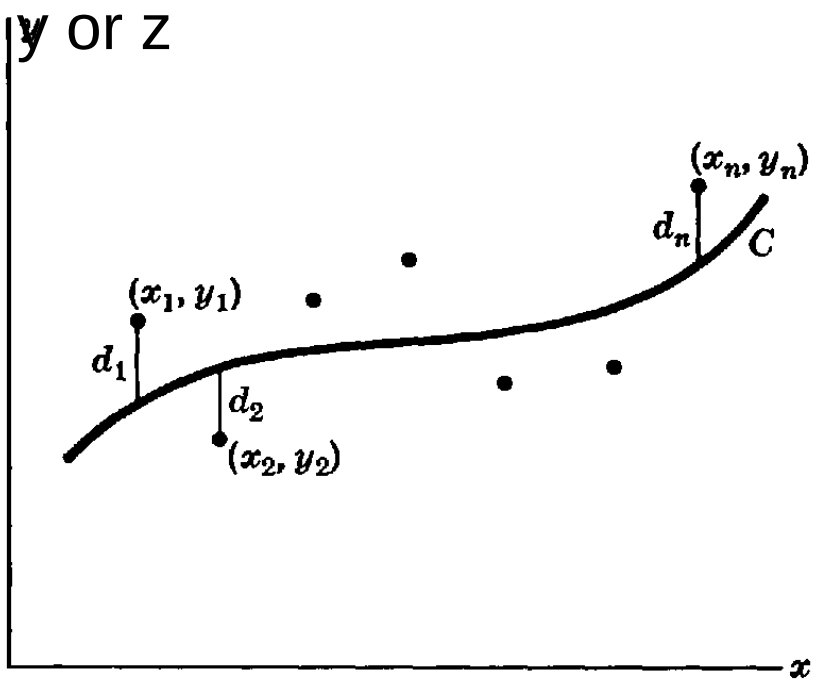
- Given, $x_i$ and $y_i$
- K number of data points



- Given, $x_i$ and $y_i$ and generated $f(x_i)$



# Deviation - error

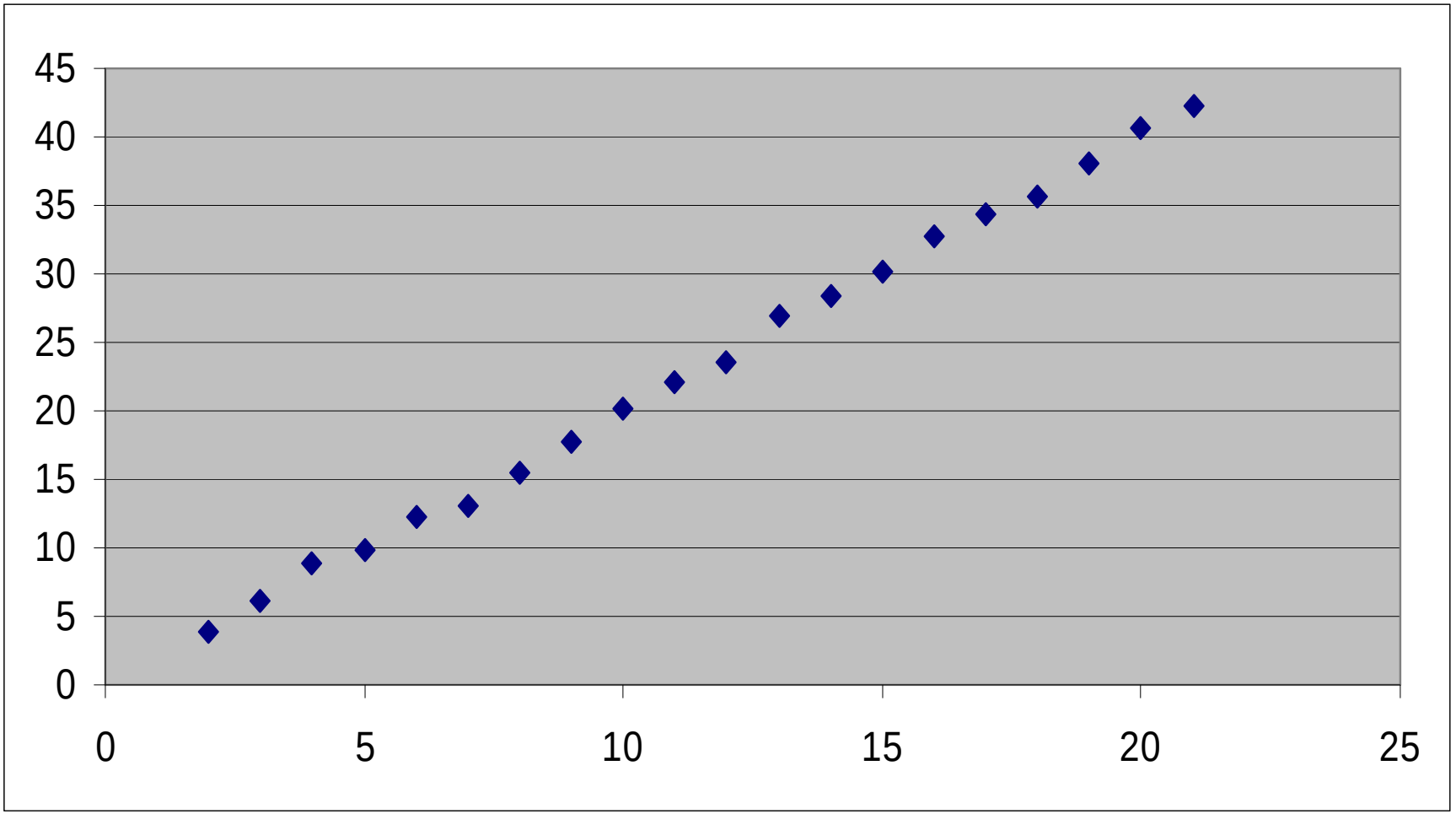


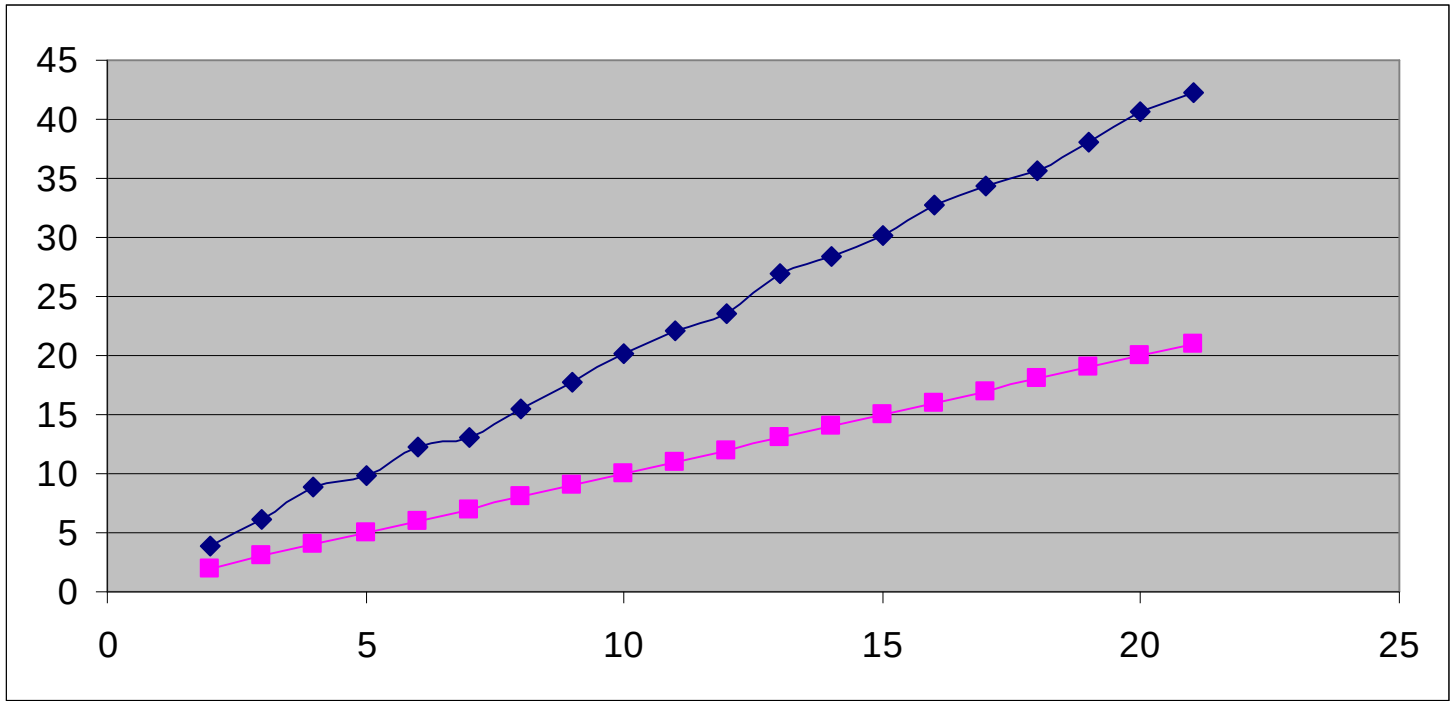

- Given, $x_i$ and $y_i$
- K number of data points
- Error = $y_i - f(x_i)$
- How many errors?
- K errors

Sum of Squared errors

$$d_1^2 + d_2^2 + \cdots + d_k^2 = \text{a minimum}$$

$$\sum_{i=1}^{K} (y_i - f(x_i))^2 \longrightarrow \text{minimize}$$

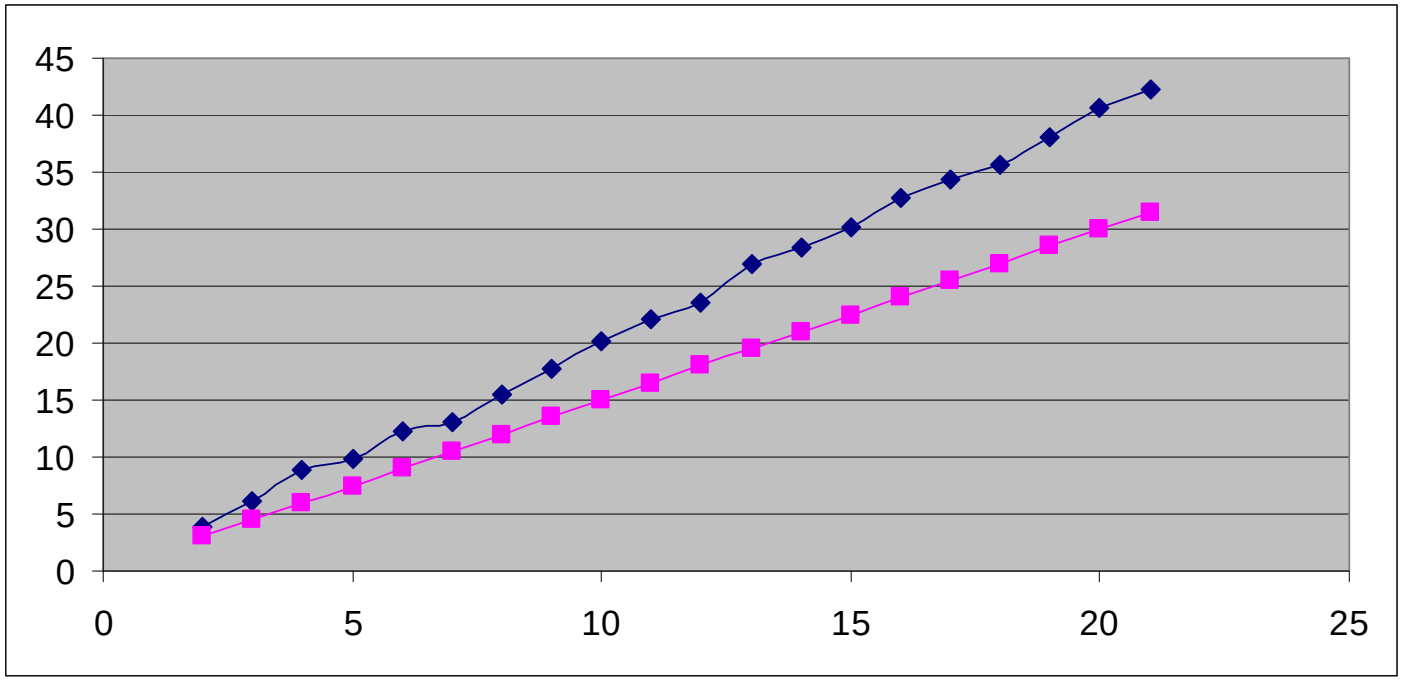

45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25




Fit with m=1, and c = 0

$y = m.x + c$

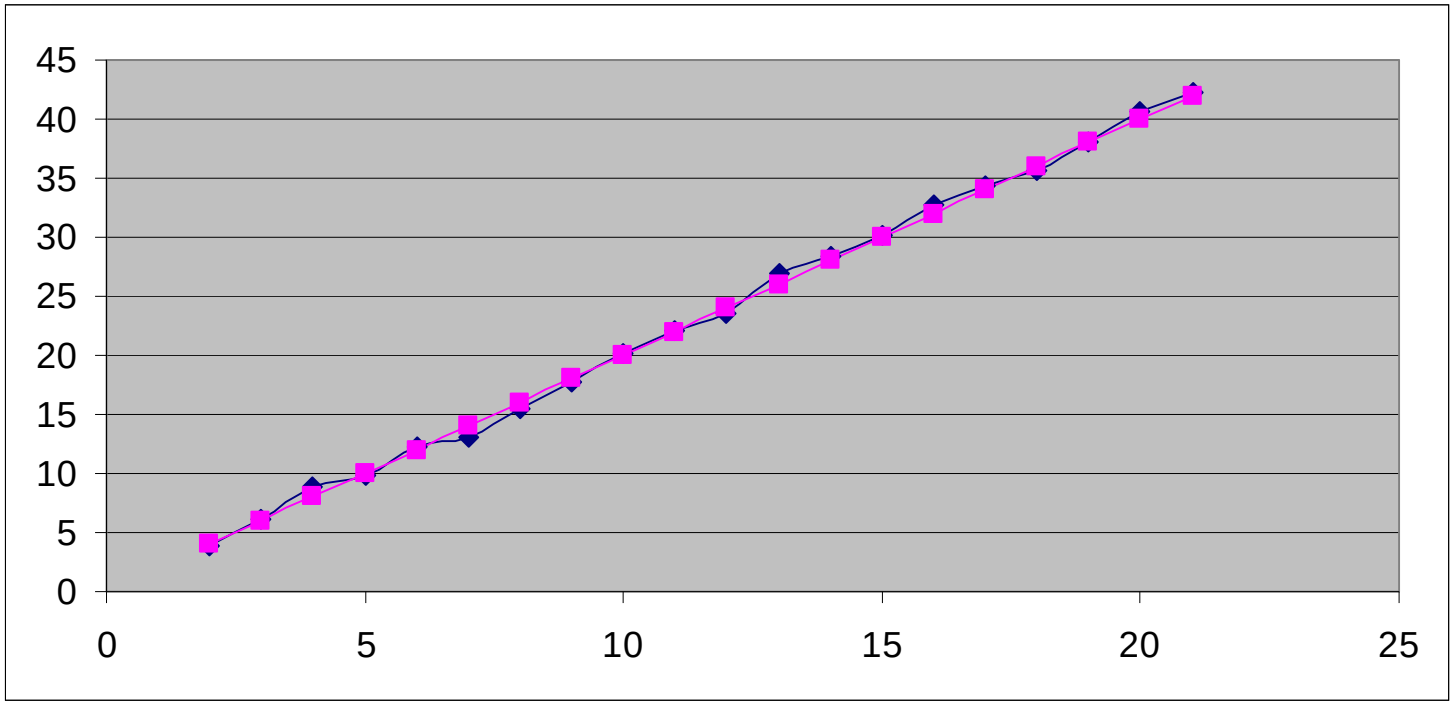
MSE = 169.7




Fit with m=1.5, and c = 0

$y = m.x + c$

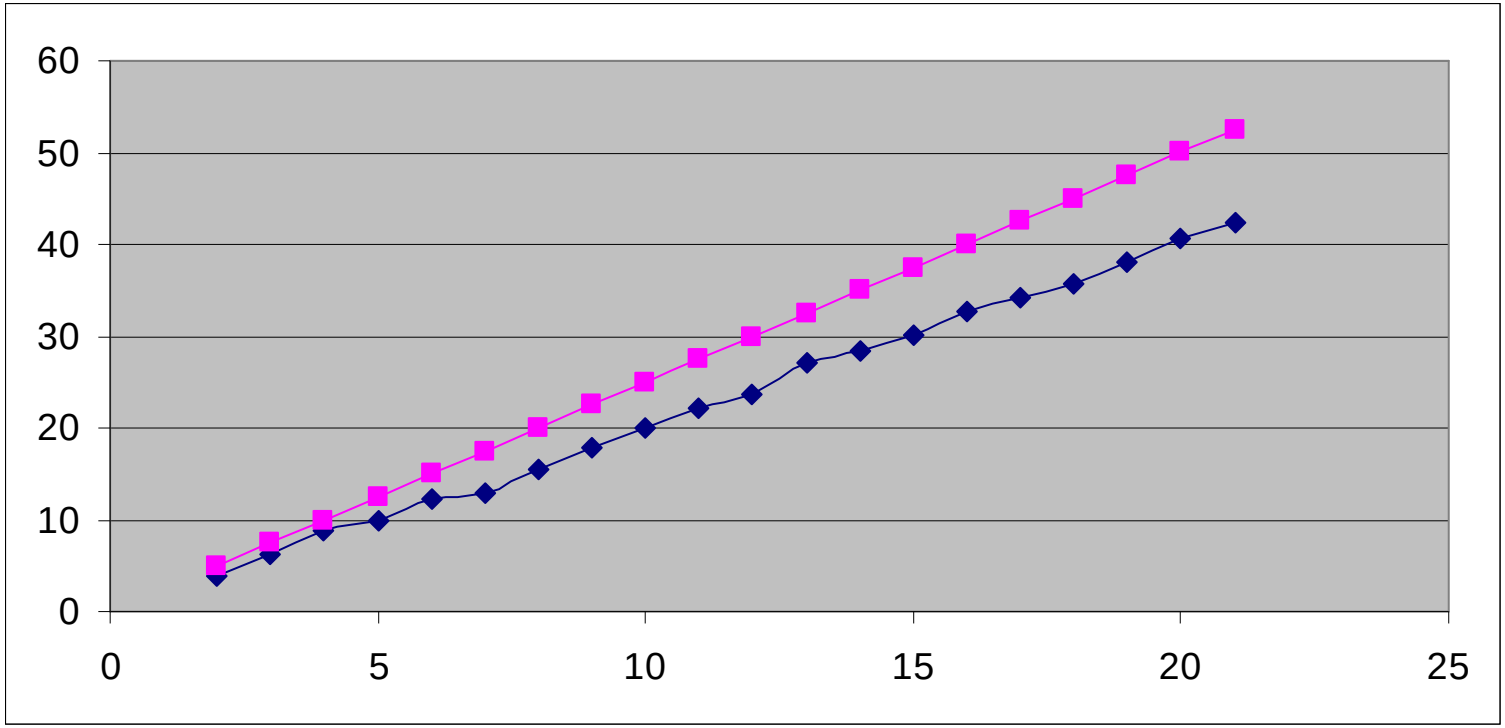
MSE = 43.6




Fit with m=2, and c = 0

$y = m.x + c$

MSE = 0.2365

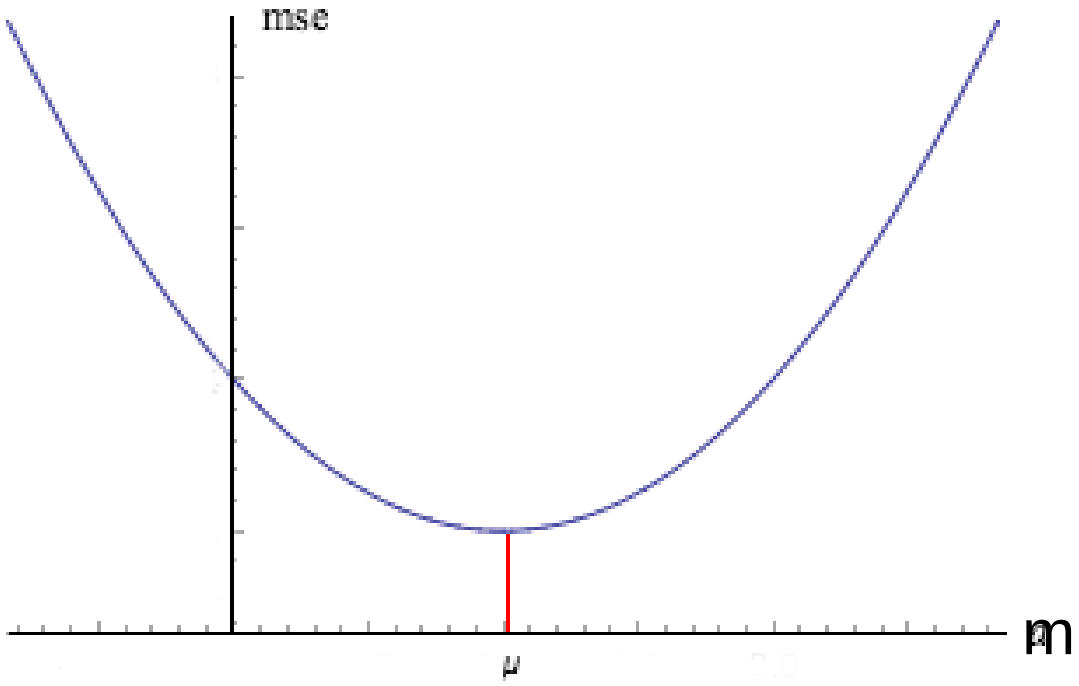



Fit with m=2.5, and c = 0

$y = m.x + c$

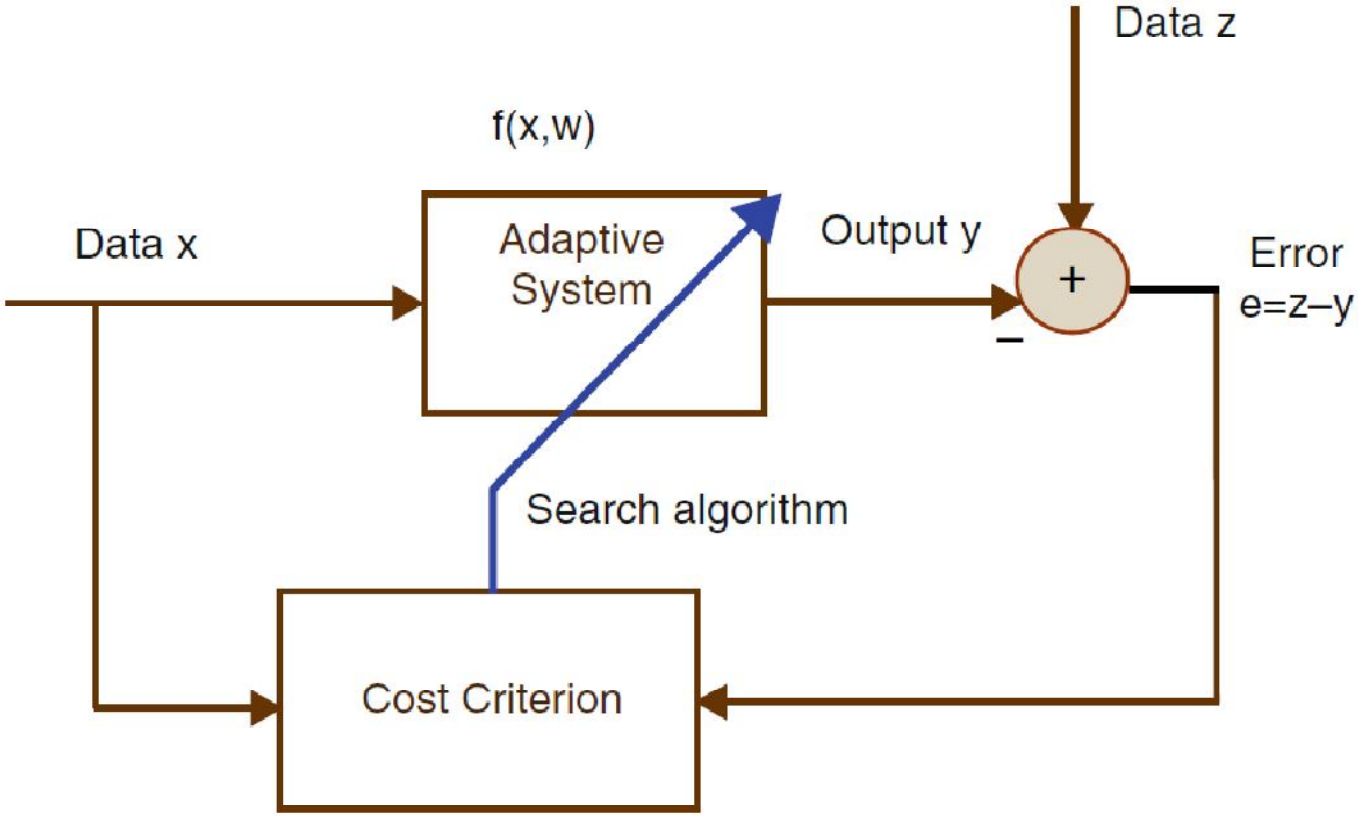
MSE = 39.6

# Minimization of MSE



# Adaptive system

- X: explanatory variable
- Y = f(x,w): generated output
- Z: response or desired output
- Error variable = z – f(x)



# Error as a random variable

- X: explanatory variable
- Y = f(x,w): generated output
- Z: response or desired output
- Error variable = z – f(x)