

$x_0, y_0, x_1, y_1, \dots, (x_{n-1}, y_{n-1})$   
 related by  $y_i = a_0 + a_1 x_i + e_i$   
 linear relationship      error  
 $e_i = y_i - a_0 - a_1 x_i$

$S_r = \sum_{i=0}^{n-1} e_i^2 = \sum_{i=0}^{n-1} (y_i - a_0 - a_1 x_i)^2$   
 Error (fitting)  
 ↳ minimise

$\frac{\partial S_r}{\partial a_0} = -2 \sum (y_i - a_0 - a_1 x_i)$  (Slope)  
 $\frac{\partial S_r}{\partial a_1} = -2 \sum [(y_i - a_0 - a_1 x_i) x_i]$  (intercept)

Set both to zero and Solve  
 Simultaneously...

$a_0 = \bar{y} - a_1 \bar{x}, \quad a_1 = \frac{\bar{y} - a_0}{\bar{x}}$   
 means