Big Data Analytics

Gradient de l'erreur

$$y = a.x + b$$

$$E_{\Omega} = \frac{1}{2n} \sum_{i=[1..n]} (\hat{y}_i - y_i)^2$$

$$E_{\Omega} = \frac{1}{2n} \sum_{i=[1..n]} (\hat{y}_i - (a.x_i + b))^2$$
...

$$\begin{array}{l} \frac{\partial E_{\Omega}}{\partial a} = \frac{1}{n} \sum_{i=[1..n]} (a.x_i + b - \hat{y}_i).x \\ \frac{\partial E_{\Omega}}{\partial b} = \frac{1}{n} \sum_{i=[1..n]} (a.x_i + b - \hat{y}_i) \end{array}$$

 $U^{2'} = 2U' * U$

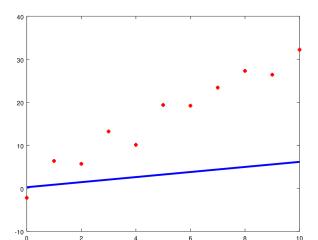
M.A.J:

$$\begin{aligned} a \leftarrow & \ a - \gamma. \frac{\partial E_{\Omega}}{\partial a} \\ b \leftarrow & \ b - \gamma. \frac{\partial E_{\Omega}}{\partial b} \end{aligned}$$

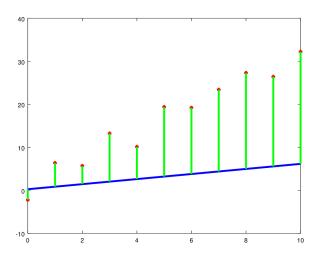
où $1 > \gamma > 0$ (learning rate)

initialisation au hasard ($\gamma = \text{0.01}$)

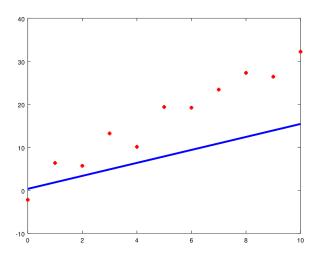
- $a = 0.58 (\hat{a} = 3.0)$
- $b = 0.25 (\hat{b} = 0.5)$



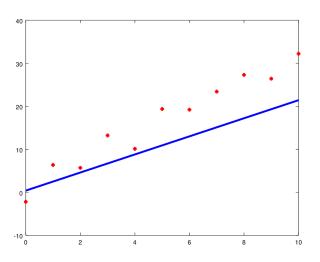
- $a = 0.58 (\hat{a} = 3.0)$
- $b = 0.25 \ (\hat{b} = 0.5)$



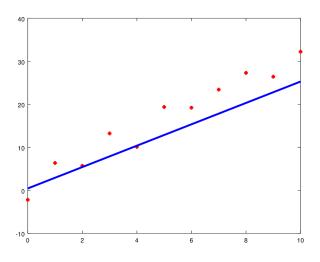
- $a = 1.50 \ (\hat{a} = 3.0)$
- $b = 0.35 (\hat{b} = 0.5)$



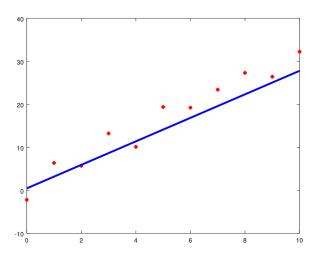
- $a = 2.10 \ (\hat{a} = 3.0)$
- $b = 0.40 \ (\hat{b} = 0.5)$



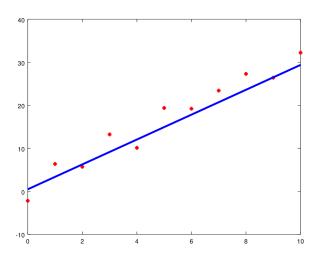
- $a = 2.48 \ (\hat{a} = 3.0)$
- $b = 0.43 \ (\hat{b} = 0.5)$



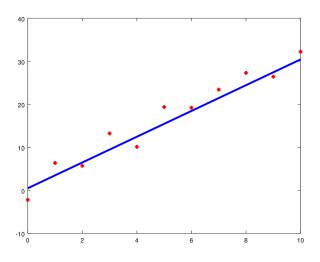
- $a = 2.73 \ (\hat{a} = 3.0)$
- $b = 0.46 \ (\hat{b} = 0.5)$



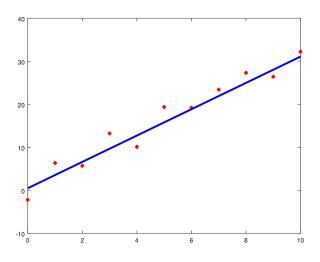
- $a = 2.89 (\hat{a} = 3.0)$
- $b = 0.47 \ (\hat{b} = 0.5)$



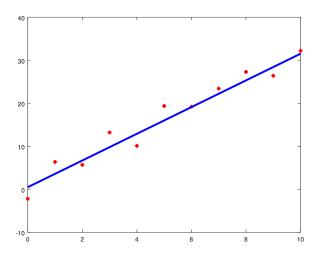
- $a = 2.99 (\hat{a} = 3.0)$
- b = 0.48 (\hat{b} = 0.5)



- $a = 3.06 (\hat{a} = 3.0)$
- $b = 0.49 \ (\hat{b} = 0.5)$



- $a = 3.10 \ (\hat{a} = 3.0)$
- $b = 0.49 (\hat{b} = 0.5)$



- $a = 3.13 \ (\hat{a} = 3.0)$
- $b = 0.50 \ (\hat{b} = 0.5)$

