Big Data Analytics

Gradient de l'erreur

Gradient et mise à jour

$$\boxed{y = a.x + b}$$

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

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

...

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

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

$$\boxed{U^{2\,\prime} = 2U' * U}$$

M.A.J :

$$a \leftarrow a - \gamma . \frac{\partial E_\Omega}{\partial a}$$

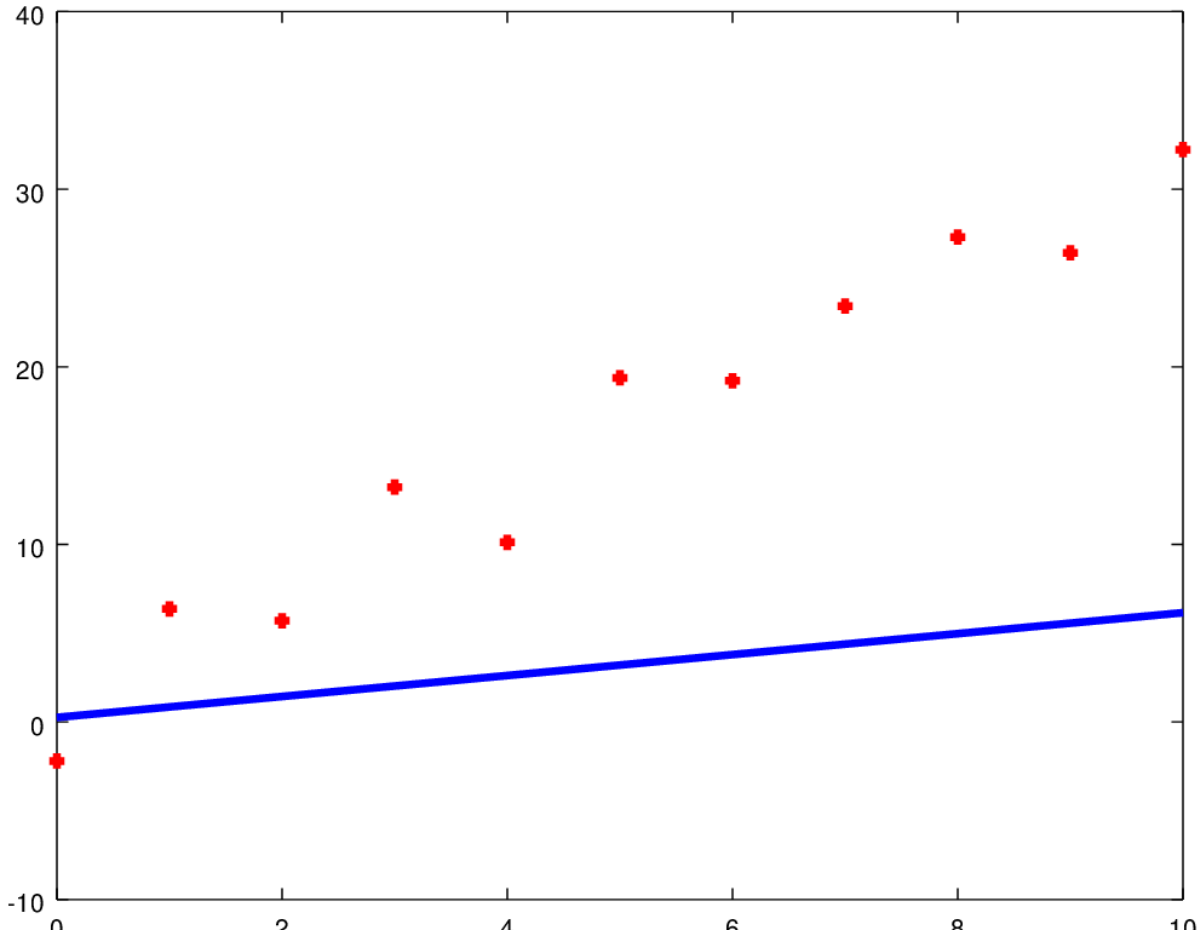
$$b \leftarrow b - \gamma . \frac{\partial E_\Omega}{\partial b}$$

où $1 > \gamma > 0$ (learning rate)

Gradient et mise à jour

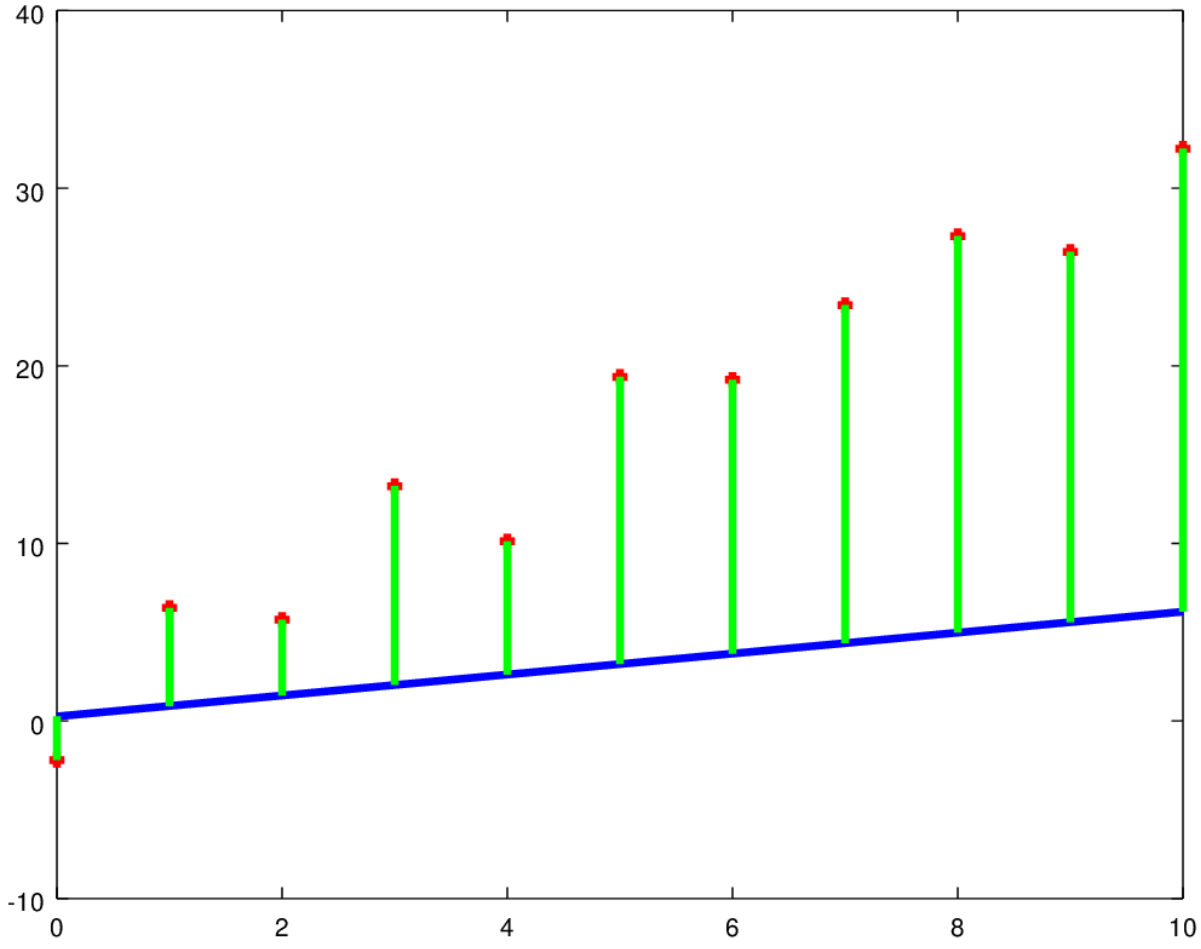
initialisation au hasard ($\gamma = 0.01$)

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



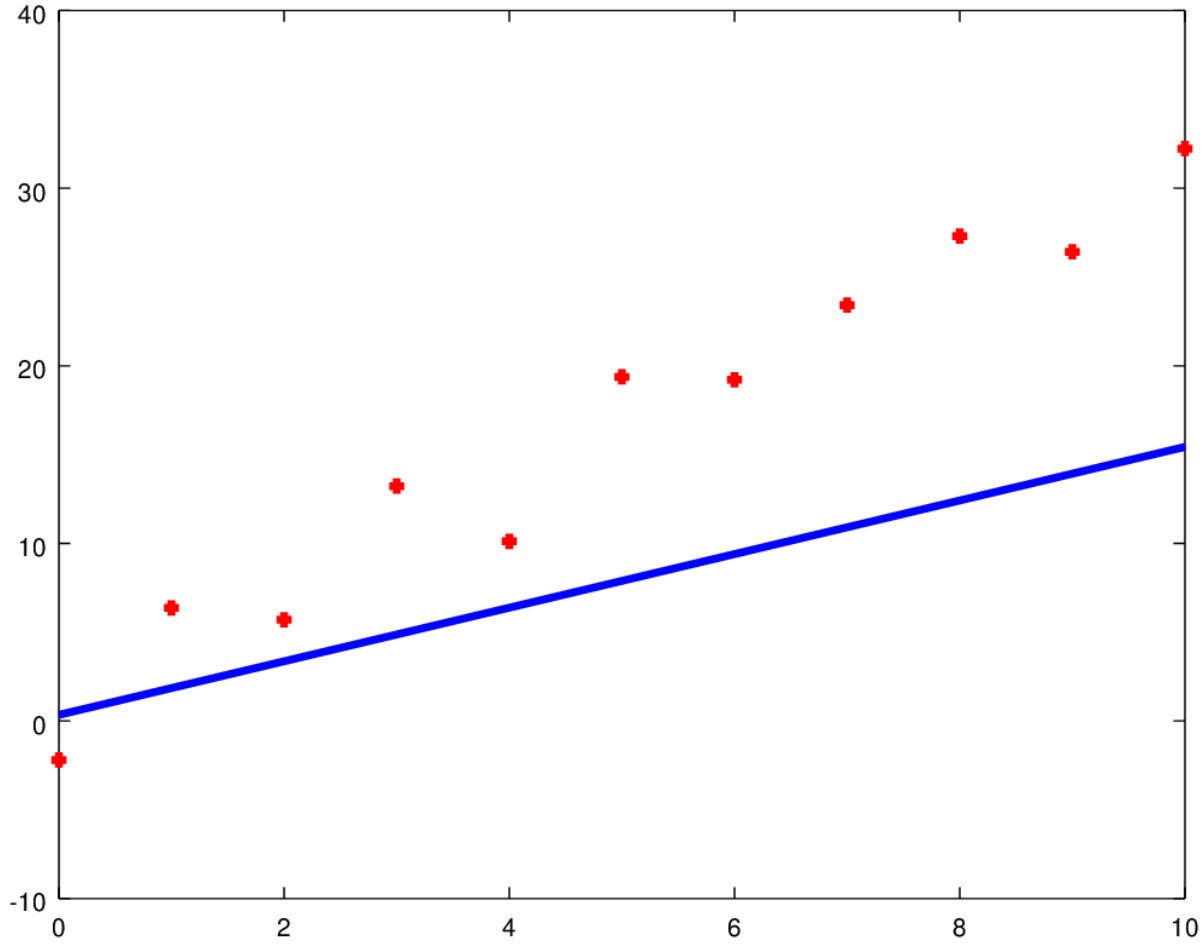
Gradient et mise à jour

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



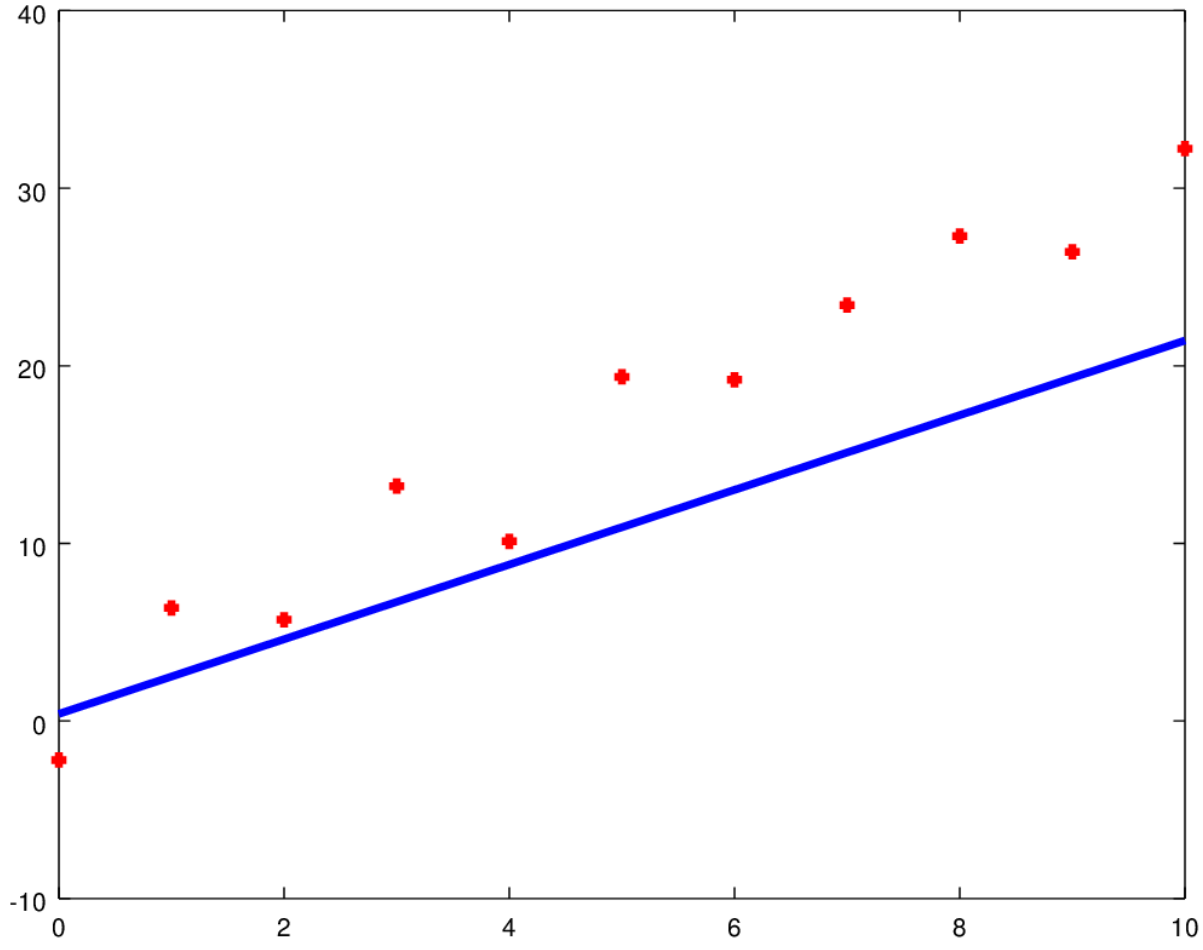
Gradient et mise à jour

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



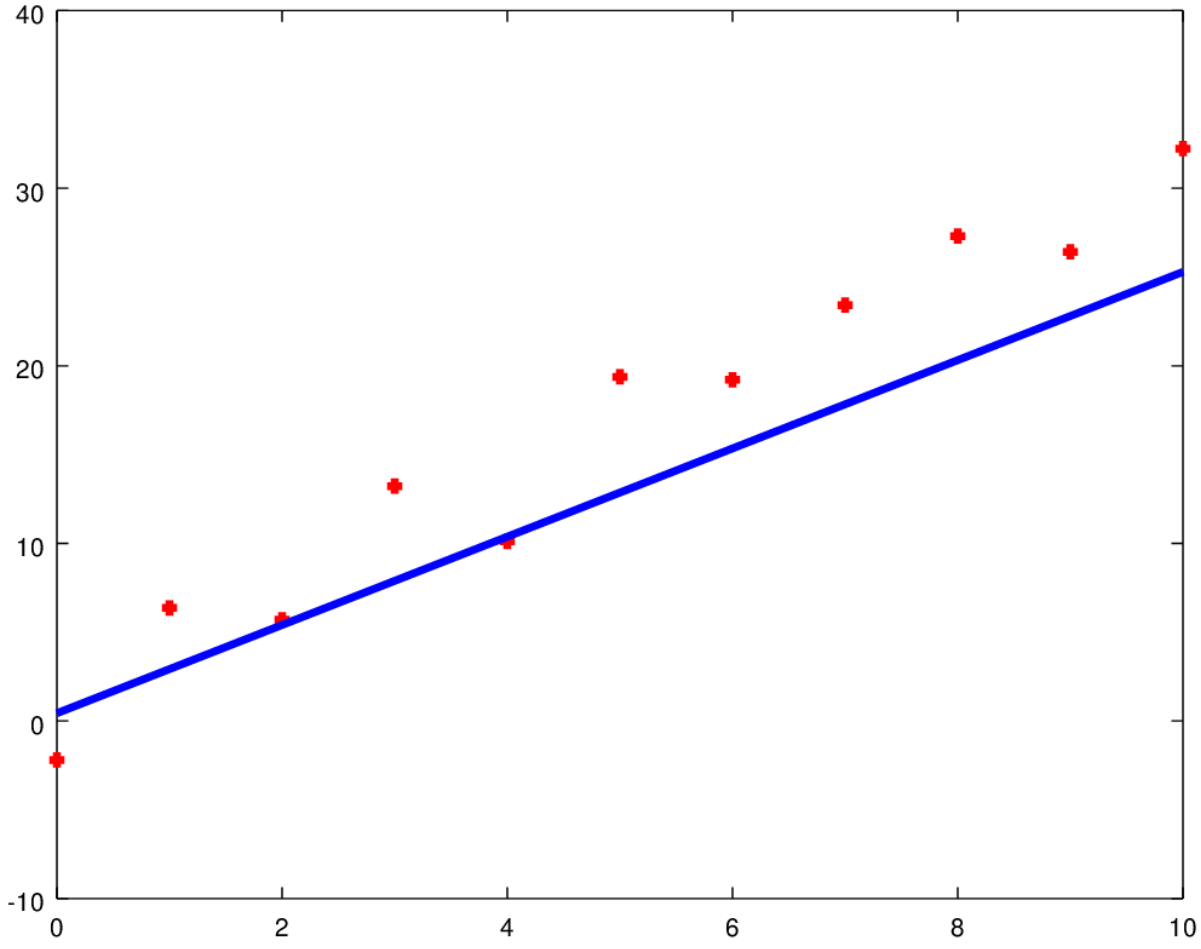
Gradient et mise à jour

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



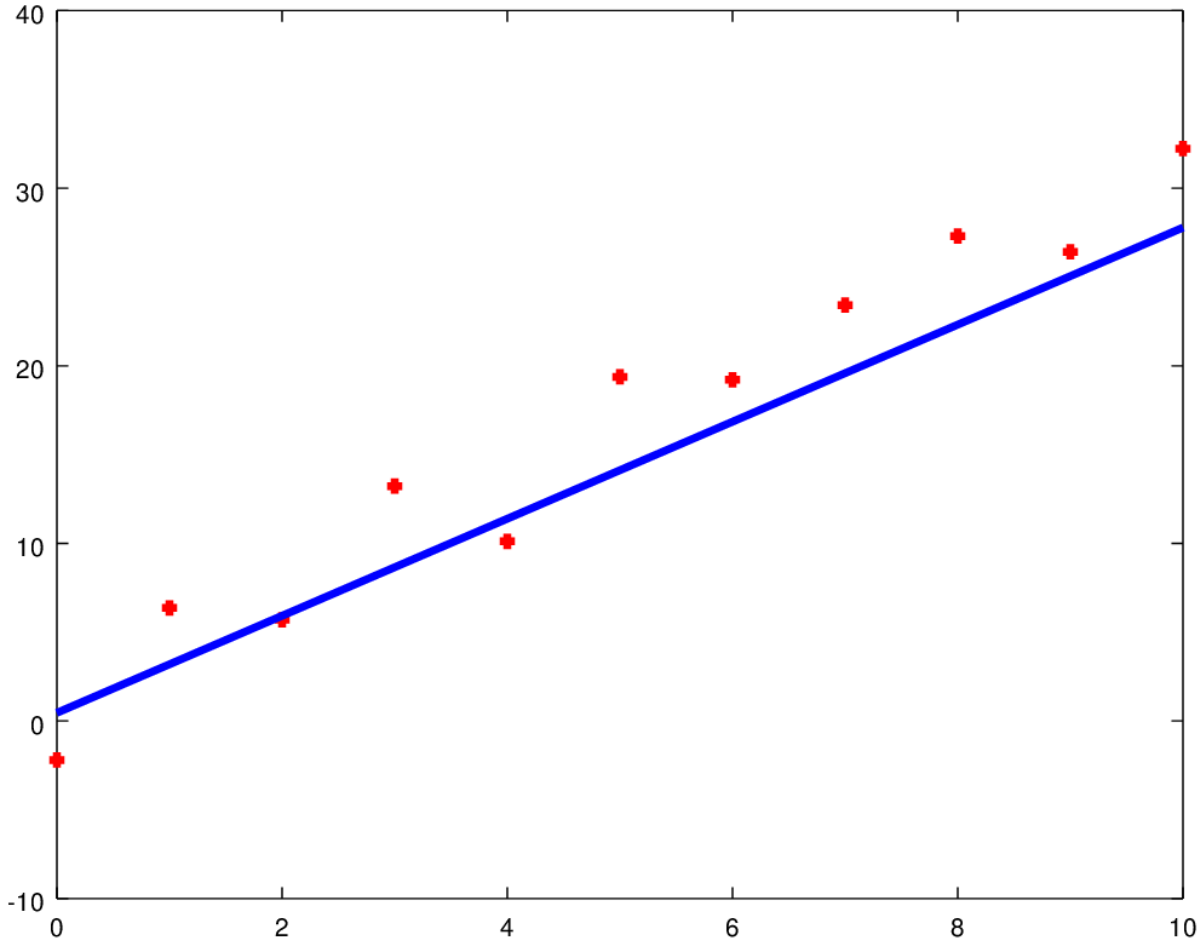
Gradient et mise à jour

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



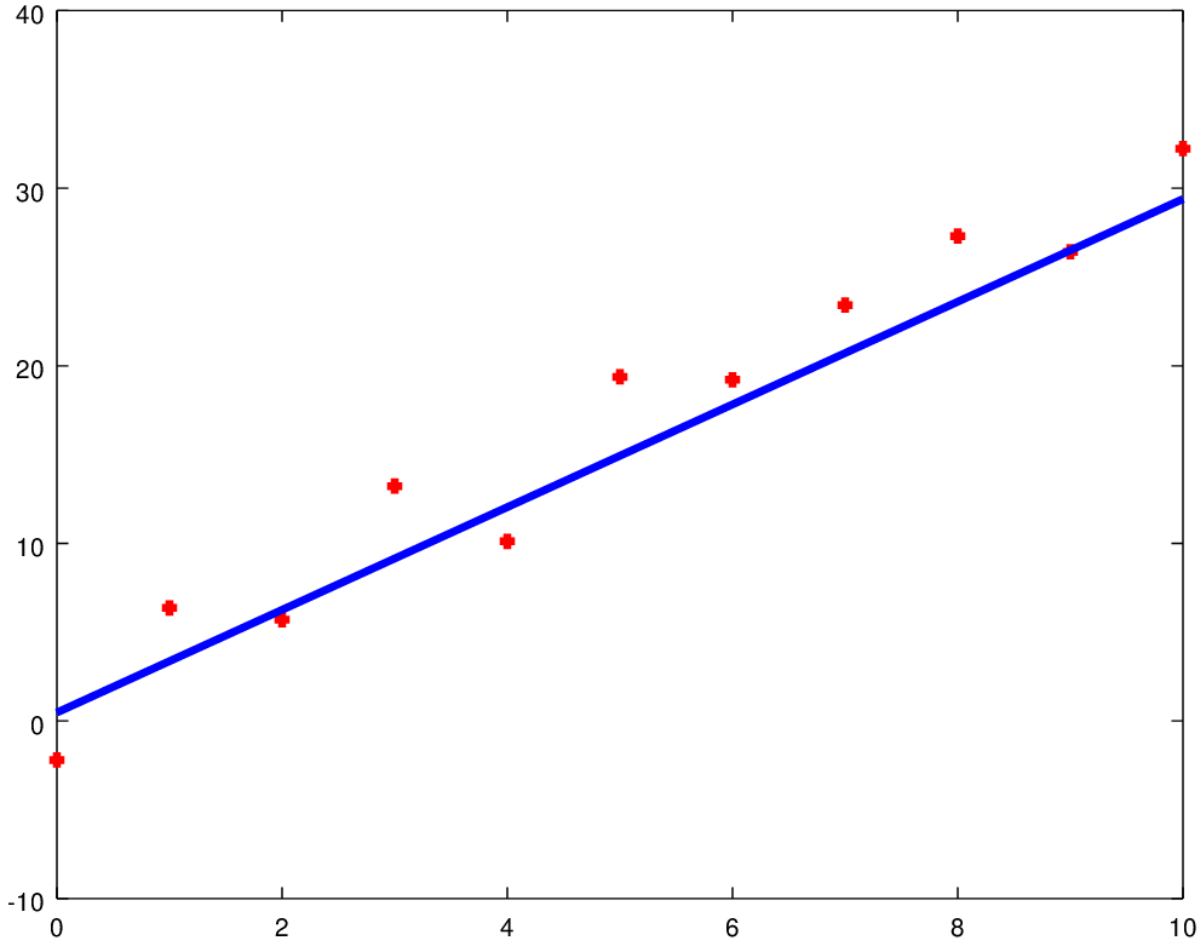
Gradient et mise à jour

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



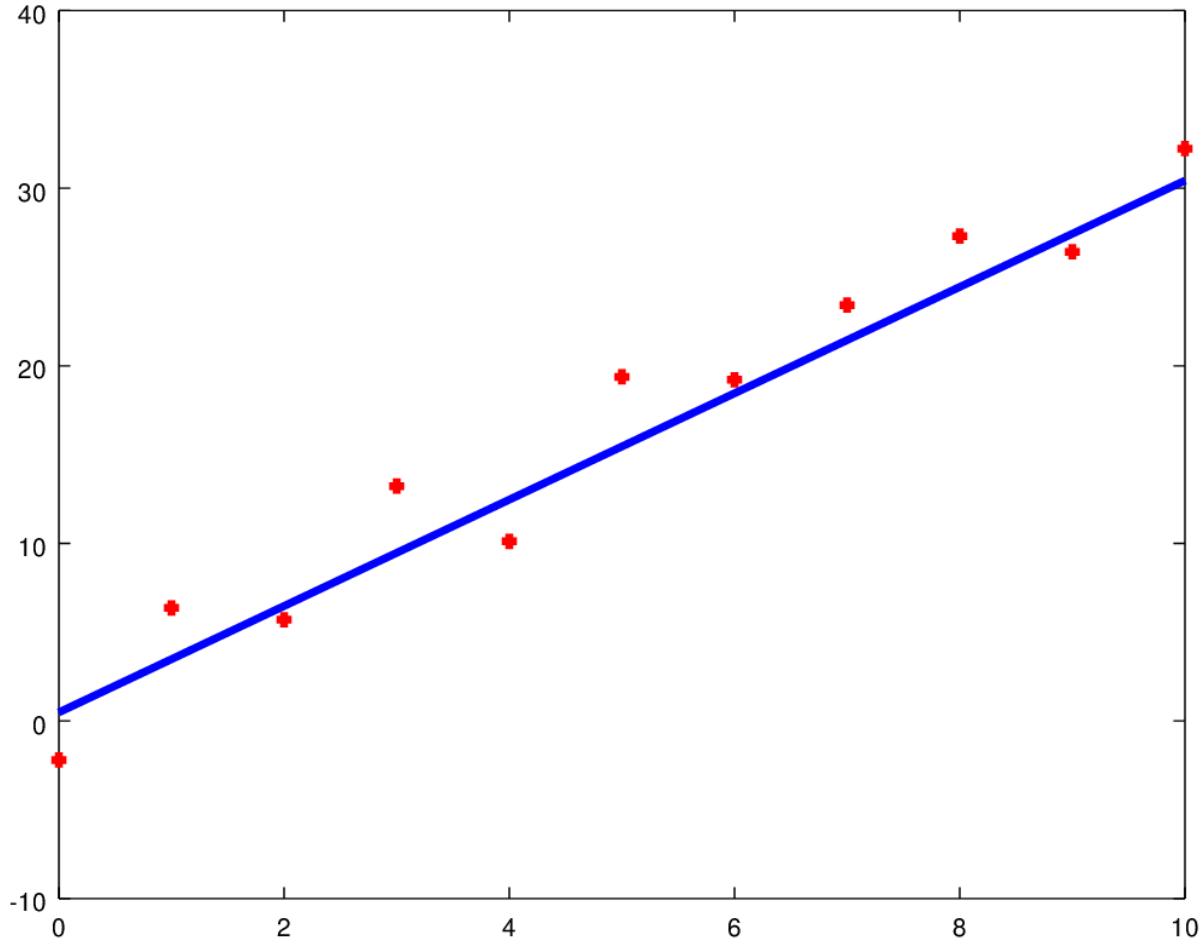
Gradient et mise à jour

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



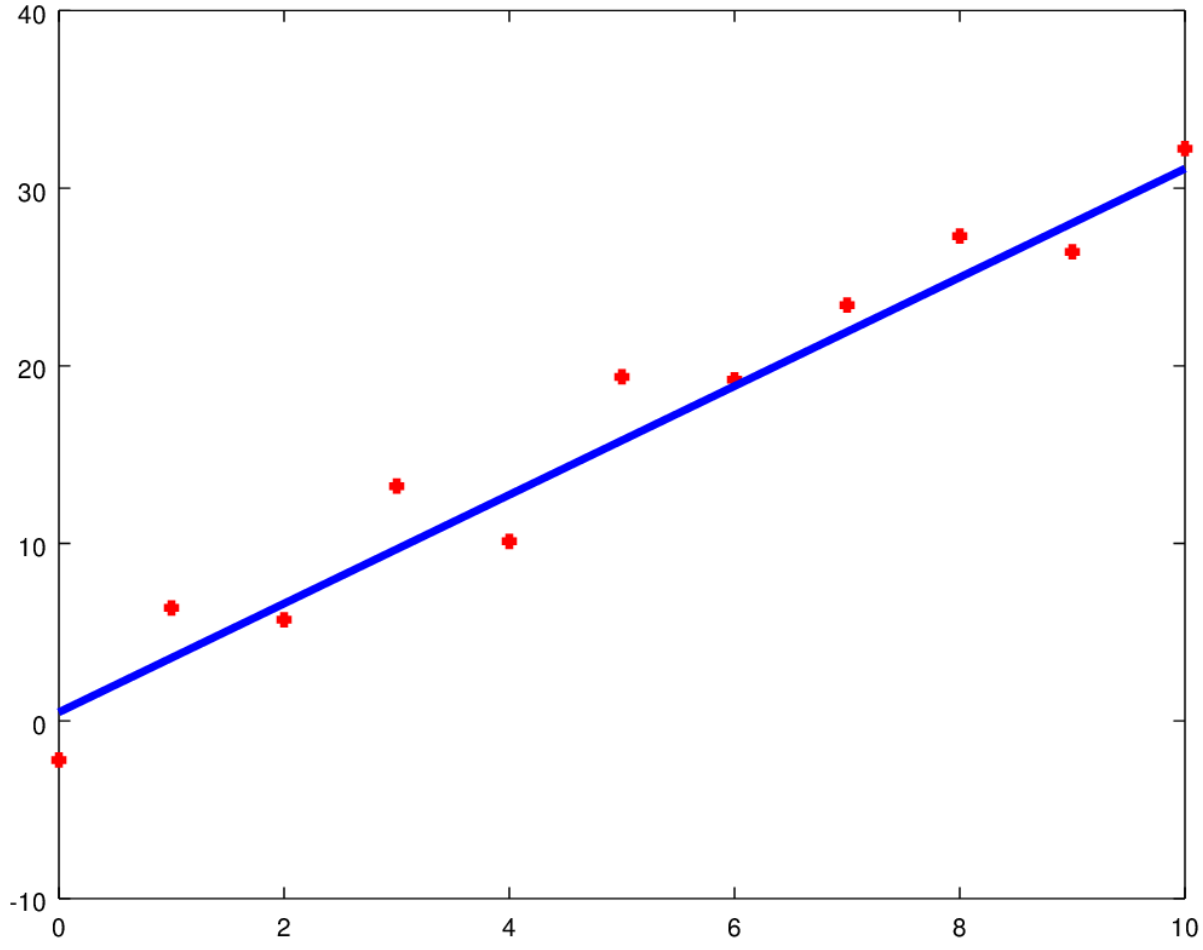
Gradient et mise à jour

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



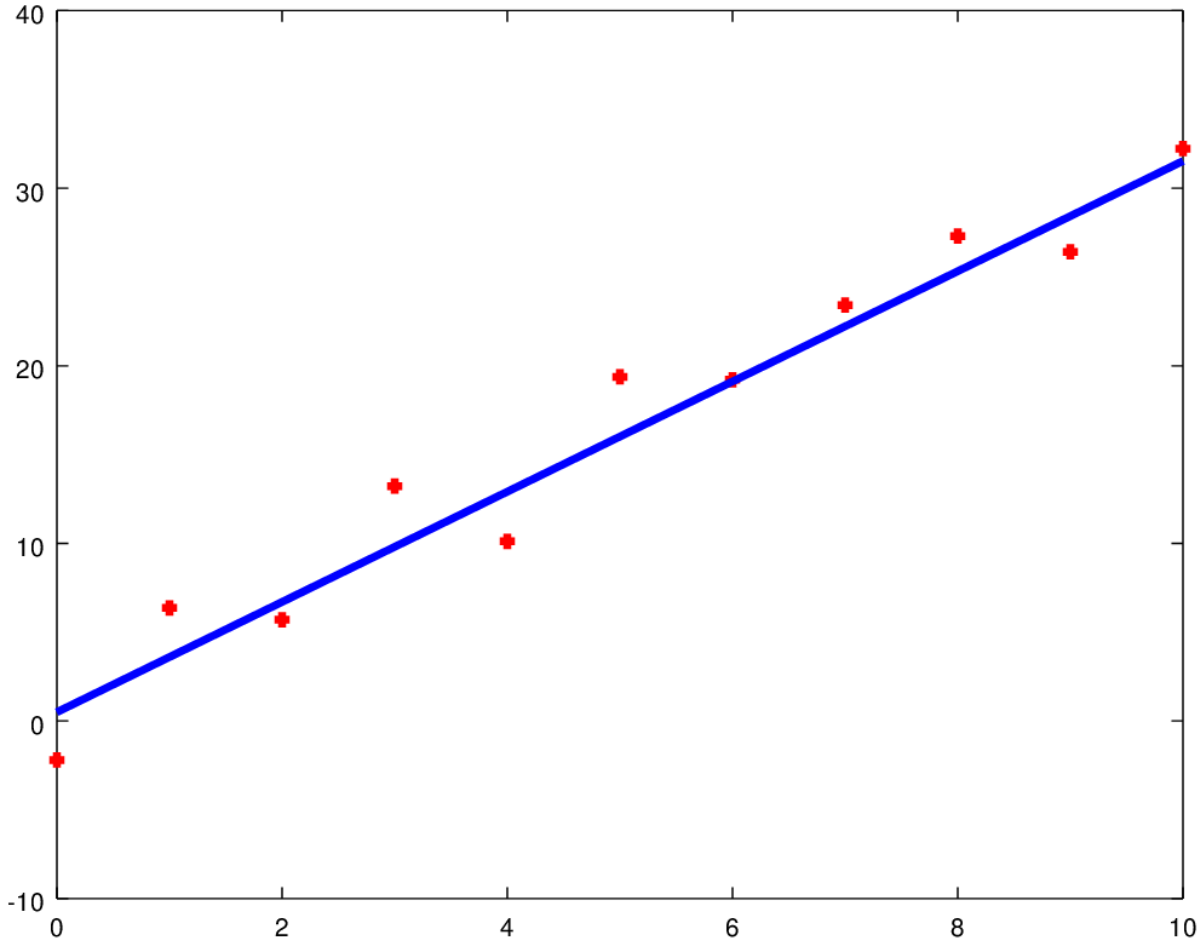
Gradient et mise à jour

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



Gradient et mise à jour

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



Gradient et mise à jour

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