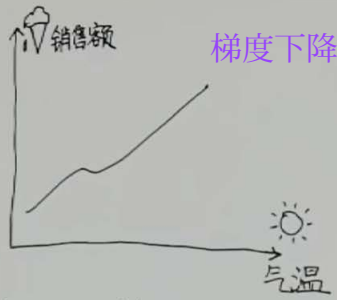
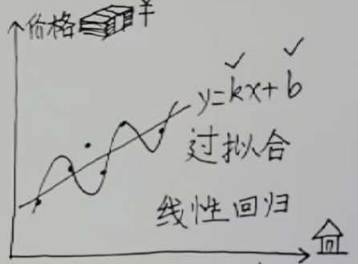
梯度下降

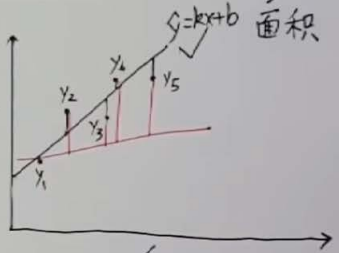
预测
规律
数据



梯度下降



选秀标准
?



直线编号	斜率	截距	MSE
1	k_1	b_1	z_1
2	k_2	b_2	z_2
3	k_3	b_3	z_3
⋮			
n	k_n	b_n	z_n

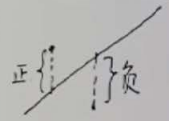
z_{min}

$$\frac{1}{5}\left[(y_1-\hat{y})^2+(y_2-\hat{y})^2+\cdots+(y_5-\hat{y})^2\right]$$

$$\frac{1}{10}\left[(y_1-\hat{y})^2+(y_2-\hat{y})^2+\cdots+(y_{10}-\hat{y})^2\right]$$

$$\frac{1}{n}\left[(y_1-\hat{y})^2+(y_2-\hat{y})^2+\cdots+(y_n-\hat{y})^2\right] \quad \text{MSE}$$

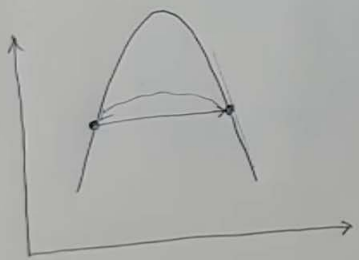
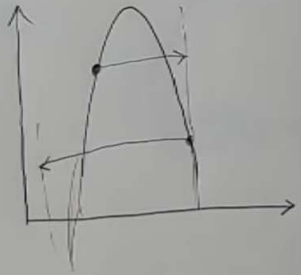
$$\frac{1}{n}\left(|y_1-\hat{y}|+|y_2-\hat{y}|+\cdots+|y_n-\hat{y}|\right) \quad \text{MAE}$$

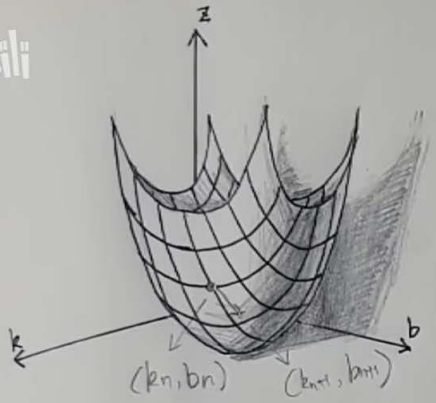


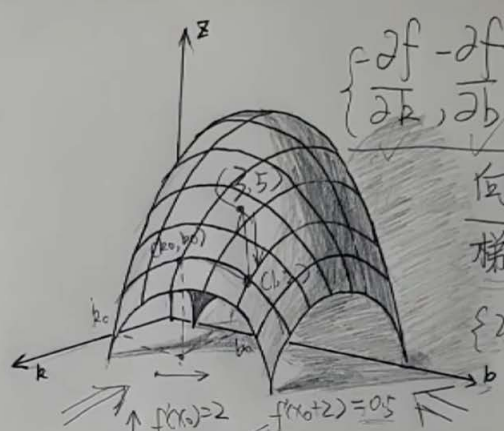
$f(k,b)=z$

损失函数！

也就是要把这个损失函数的最低的位置找出来

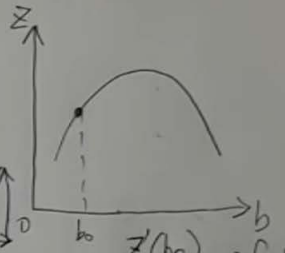


$$\left\{\frac{\partial f}{\partial k}, \frac{\partial f}{\partial b}\right\}$$

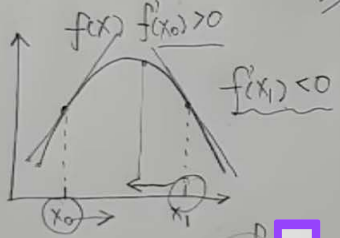
向量

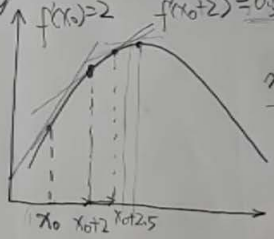
梯度

{2,3}



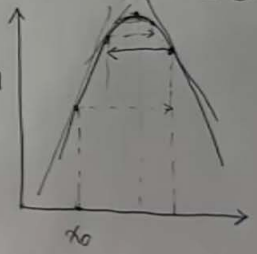
$$\left.\frac{\partial f}{\partial b}\right|_{b=b_0}$$





$x_n + \alpha f'(x_n) = x_{n+1}$

学率



$$k_{n+1} = k_n - \alpha \left.\frac{\partial f}{\partial k}\right|_{k=k_n}$$

$$b_{n+1} = b_n - \alpha \left.\frac{\partial f}{\partial b}\right|_{b=b_n}$$

$$y = kx + b$$