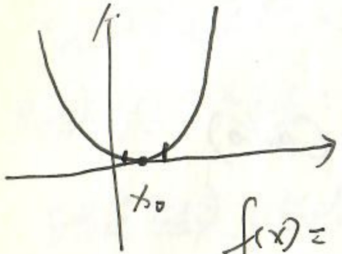
泰勒展开式 (3Blue1Brown)

函数在某点的各阶导数与构造的多项式的对应导数相同.



$y = f(x)$

$y_0 = f(x_0)$

$f(x) = f(x_0 \pm \Delta x) = y_0 \pm f'(x_0 \pm \Delta x)$, $\Delta x \to 0$

由于 $y_0 = f(x_0)(x-x_0)^0$

$f(x) = f^{(0)}(x_0)(x-x_0)^0 + f'(x_0)(x-x_0)^1$

是否: $f(x) = \sum_{i=0}^{n} f^{(i)}(x_0)(x-x_0)^i$

$f'(x) = f'(x_0)$

$f''(x) = 2f''(x_0)$??

对 $f^{(m)}(x_0)(x-x_0)^m$ 求导看看:

m阶导: $m!\,f^{(m)}(x_0)$　m+1阶导: 0.

—m阶导—: m阶导以后都是0, m阶导之前 $(x-x_0)$ 都是 0.

对 $f(x)$ 求m阶导为 $m!\,f^{(m)}(x)$

2019.11.15.

为什么梯度下降更新参数有效.

$\Delta w_{hj} = -\eta \frac{\partial E_k}{\partial w_{hj}}$

$w_{hj} = w_{hj} + \Delta w_{hj}$

$= w_{hj} - \eta \frac{\partial E_k}{\partial w_{hj}}$

η: 学习率

$\frac{\partial E_k}{\partial w_{hj}}$: 梯度.

如果一个函数n阶可导,那么我们可以用多项式仿造一个相似的函数,这就是泰勒展开式.

$f(x)_{taylor} = \sum_{n=0}^{\infty} \frac{f^{(n)}(a)}{n!} \times (x-a)^n$

$= f(a) + \frac{f'(a)}{1!}(x-a) + \frac{f^{(2)}(a)}{2!}(x-a)^2 + \cdots$

$+ \frac{f^{(n)}(a)}{n!}(x-a)^n + R_n(x)$

$f(x)_{taylor} = \sum_{i=0}^{n} \frac{f^{(i)}(x_0)}{i!}(x-x_0)^i$, $x \in (x_0-\Delta x, x_0+\Delta x)$

无限逼近