《数值计算方法》板书

补充讲：① 梯度下降算法
（优化）

② 偏微分方程.

$$\sum_{i=1}^{n} i = \frac{1}{2} n(n+1)$$ 高斯

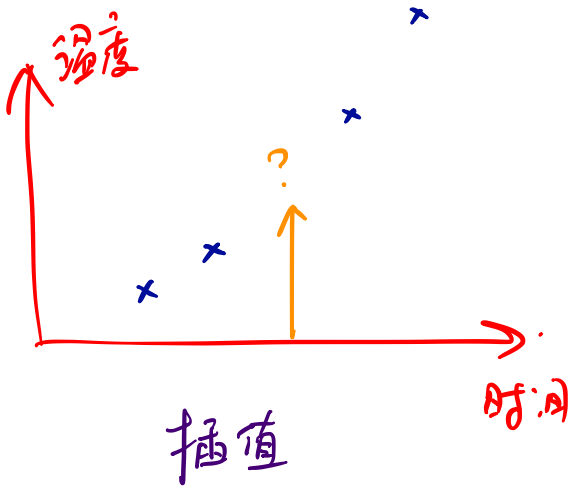
$$\frac{dy}{dx} = f(x,y)$$ 常微分方程

$$\frac{dy}{dx} = x \Rightarrow y = \frac{1}{2}x^2 + C$$

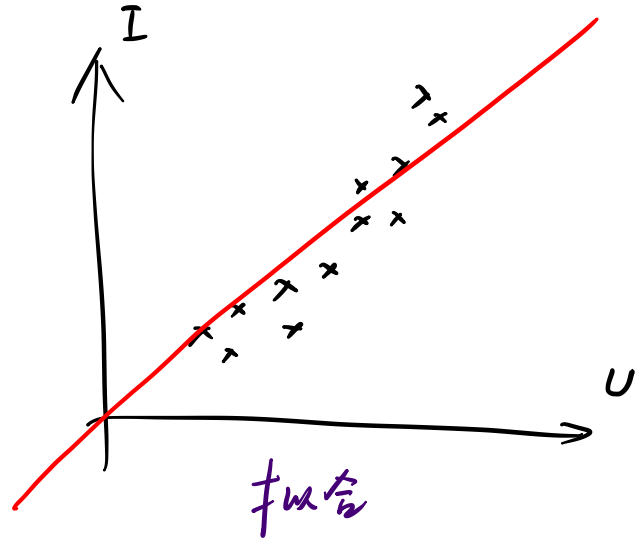
$x=0$ 时. $y=0 \Rightarrow C=0$

$$Ax = y$$

线性方程组



插值

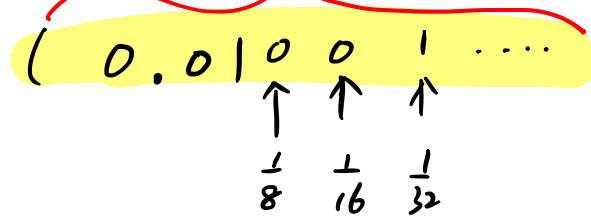


拟合

$(0.5)_{10}$ 的二进制 $(0.1)_2$

$(0.3)_{10}$ 的二进制

32位二进制表示浮点数



0.05

0.125

0.0625

0.03125

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float  x = 1.0 / 3.0;
if (fabs(x * 3.0 - 1) < 1e-10)
```

浮点数的判断

$H = 6.0 \pm 0.2 \qquad D = 5.0 \pm 0.1$

$$V = \frac{\pi}{4} D^2 H$$

$$V^* = \frac{\pi}{4} \times 5^2 \times 6$$

$$V - V^* = \frac{\partial V}{\partial H} \cdot (H - H^*) + \left(\frac{\partial V}{\partial D}\right)(D - D^*)$$

$$= \frac{\pi}{4} D^2 (\pm 0.2) + \frac{\pi}{2} DH \quad (\pm 0.1)$$

$$e_r = \frac{V - V^*}{V} = \cdots$$

大数吃小数

$x = 50324.$

$y = 0.37621$

5位浮点小数

5位指数.

$x = 5.0324 \times 10^{4}$ +

$y = 3.7621 \times 10^{-1}$

$z = x + y = {}^{+}5.0324\,3\,7621 \times 10^{+4}$

$\rightarrow 5.0324 \times 10^{4}$

相接近的两数相减

$x = 3.1426 \times 10^{4}$ (4)

$y = 3.1423 \times 10^{4}$ (4)

相对误差

$\varepsilon_r \approx 10^{-4}$

$x - y = 0.0003 \times 10^{4}$

$= 3$ (1)

$\varepsilon_r \approx \frac{1}{10}$