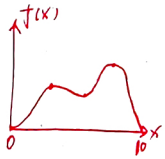
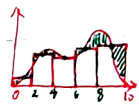
数值计算 (Numric Computing)

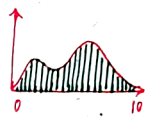
▸ Integral Computing (积分计算)



$\Delta x = 2$



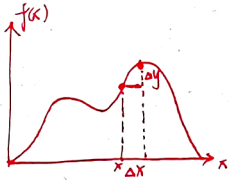
$\Delta x = 0.2$



▨ = Error

$$\int_{x_0}^{x_n} f(x)\,dx = \sum_{i}^{n} f(x_i + \frac{\Delta x}{2}) \cdot \Delta x + \text{Error}$$

▸ Derivative Computing (导数计算)



$$f'(x) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{\Delta x \to 0} \frac{f(x+\Delta x) - f(x)}{\Delta x}$$

$\Delta x \downarrow$ Accurate $\uparrow$

▸ Matrix Computing (矩阵计算)

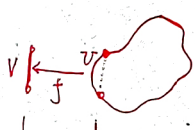
① Matrix $A = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ & & \vdots & \\ a_{m1} & a_{m2} & \cdots & a_{mn} \end{bmatrix}$

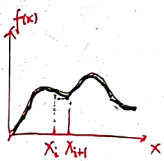
$m=n$: $A \cdot \square = \square$ (linear transforming)

$m \neq n$: $A \cdot \square = \square$ (into another space).

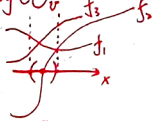
② Solving Equation: $A\vec{x} = \vec{b}$, $A, \vec{b}$ is knowing, to get $\vec{x}$;

▸ Linear Approximation (线性逼近)





$\forall g \in \mathcal{O}_V \mapsto \exists f \circ g \in \mathcal{O}_V$



① 对 $f_i, f_j \in \mathcal{O}_V$

$\Downarrow$

$f_k = f_i \circ f_j \in \mathcal{O}_V$

② $f_i, f_j \in \mathcal{O}_V$

$f_i + f_j \in \mathcal{O}_V$