

留数法

1. 单根

$$\frac{1}{x^2 + 2x - 8} = \frac{1}{(x-2)(x+4)} = \frac{A}{x-2} + \frac{B}{x+4}$$

$\begin{array}{cc} & \times \\ 2 & -4 \end{array}$

$$\begin{cases} A = \frac{1}{6} \\ B = \frac{1}{2} \end{cases}$$

$\begin{array}{cc} 1 & -2 \\ 1 & 4 \end{array}$

$$\frac{x+4}{x^3 + 3x^2 + 2x} = \frac{x+4}{x(x^2 + 3x + 2)} = \frac{x+4}{x(x+2)(x+1)}$$

$\begin{array}{ccc} 0 & -2 & -1 \end{array}$

$$\frac{A}{x} + \frac{B}{x+2} + \frac{C}{x+1}$$

$$A = \frac{x+4}{(x+2)(x+1)} \Big|_{x=0} = 2$$

$$B = \frac{x+4}{x(x+1)} \Big|_{x=-2} = 1$$

$$C = \frac{x+4}{x(x+2)} \Big|_{x=-1} = -3$$

2. 重根

$$\frac{1}{(x+1)(x^2-5x-6)} = \frac{1}{(x+1)(x+1)(x-6)} = \frac{A}{(x+1)^2} + \frac{B}{x+1} + \frac{C}{x-6}$$

$\begin{array}{ccc} 1 & & -6 \\ | & & | \end{array}$

$$A = \frac{1}{x-6} \Big|_{x=-1} = -\frac{1}{7}$$

$$C = \frac{1}{(x+1)^2} \Big|_{x=6} = \frac{1}{49}$$

$$B = \left(\frac{1}{x-6} \right)' = -\frac{1}{(x-6)^2} \Big|_{x=-1} = -\frac{1}{49}$$

$$y = \sin x$$

主值区间

$$\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$$



$$y = \underset{\text{弧度}}{\arcsin x}, x \in [-1, 1]$$

$$y \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$$



