# 計算機在工程應用— 柯西主值積分

$$\int_{-a}^{a} \frac{f(x)}{x} dx = ?$$

$$\int_{-a}^{0} \frac{f(x)}{x} dx + \int_{0}^{a} \frac{f(x)}{x} dx = ?$$

$$\int_{0}^{a} \frac{f(x) - f(-x)}{x} dx = ?$$

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

$\frac{f(x)}{x}$ $is$ $singular$ $function,$ $if$ $f(0) \neq 0$

$\frac{f(x) - f(-x)}{x}$ $is$ $regular$ $function$

Methods of solution:

(1). Gaussian quadrature for $\int_{-a}^{a} \frac{f(x)}{x} dx$

(2). Gaussian quadrature for $\int_{0}^{a} \frac{f(x) - f(-x)}{x} dx$

(3). Trapezoidal reule for $\int_{0}^{a} \frac{f(x) - f(-x)}{x} dx$

Comparisons for the three methods.

<center>【存檔：c:/ctex/course/cauchy1.te】【建檔:Sep./18/'95】</center>