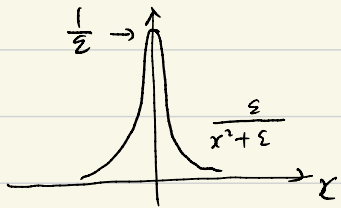


附录: $\frac{1}{x+i\varepsilon} = P\frac{1}{x} - i\pi\delta(x)$ 的直观理解 (A. Zee book)

$$\frac{1}{x+i\varepsilon} = \frac{x}{x^2+\varepsilon^2} - \frac{i\varepsilon}{x^2+\varepsilon^2}$$

注意



$$\int_{-\infty}^{\infty} \frac{\varepsilon dx}{x^2+\varepsilon^2} = \pi \quad \therefore \delta(x) = \frac{1}{\pi} \lim_{\varepsilon \rightarrow 0} \frac{\varepsilon}{x^2+\varepsilon^2}$$

此外主值积分的定义为: $\int dx P\frac{1}{x} f(x) = \lim_{\varepsilon \rightarrow 0} \int dx \frac{x}{x^2+\varepsilon^2} f(x)$