频域微分积分特性例2

例2

求 $\int_0^{\infty} \frac{\sin(a\omega)}{\omega} \mathrm{d}\omega$

解：

$$g_{2a}(t) \longleftrightarrow \frac{2\sin(a\omega)}{\omega}$$

$$g_{2a}(t) = \frac{1}{2\pi}\int_{-\infty}^{\infty} \frac{2\sin(a\omega)}{\omega} \mathrm{e}^{j\omega t} \mathrm{d}\omega = \frac{1}{\pi}\int_{-\infty}^{\infty} \frac{\sin(a\omega)}{\omega} \mathrm{e}^{j\omega t} \mathrm{d}\omega$$

$$g_{2a}(0) = \frac{1}{\pi}\int_{-\infty}^{\infty} \frac{\sin(a\omega)}{\omega} \mathrm{d}\omega \qquad \int_0^{\infty} \frac{\sin(a\omega)}{\omega} \mathrm{d}\omega = \frac{\pi}{2}$$