

1.

(1)

$$F(\omega) = \frac{1}{1-j\omega} = \frac{1}{\sqrt{1+\omega^2}} e^{j \tan^{-1}(\omega)}$$
$$\therefore |F(\omega)| = \frac{1}{\sqrt{1+\omega^2}}, \quad \phi(\omega) = \tan^{-1}(\omega)$$

(2)

$$F(\omega) = \omega - j\omega = \sqrt{2}\omega e^{-j\frac{\pi}{4}}$$
$$\therefore |F(\omega)| = \sqrt{2}\omega, \quad \phi(\omega) = -\frac{\pi}{4}$$

(3)

$$F(\omega) = \cos 2\omega + j \sin 2\omega = e^{j2\omega}$$

$$\therefore |F(\omega)| = 1, \quad \phi(\omega) = 2\omega$$

2.

(1) 略

(2) $2\ln 2$

$$(3) F(\omega) = \frac{1}{1+j\omega} + \frac{1}{1-j\omega} = \frac{2}{1+\omega^2}$$

3.

(1) 略

$$(2) F(\omega) = 2 \int_0^1 \cos \omega t dt = \frac{2}{\omega} \sin \omega$$

(3) 略