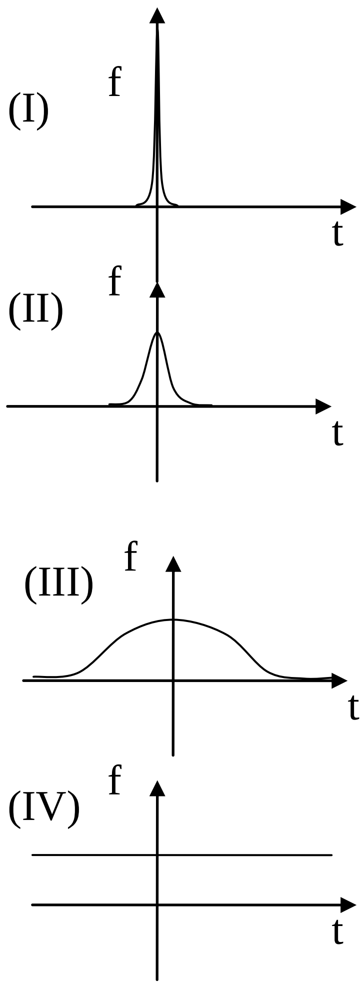
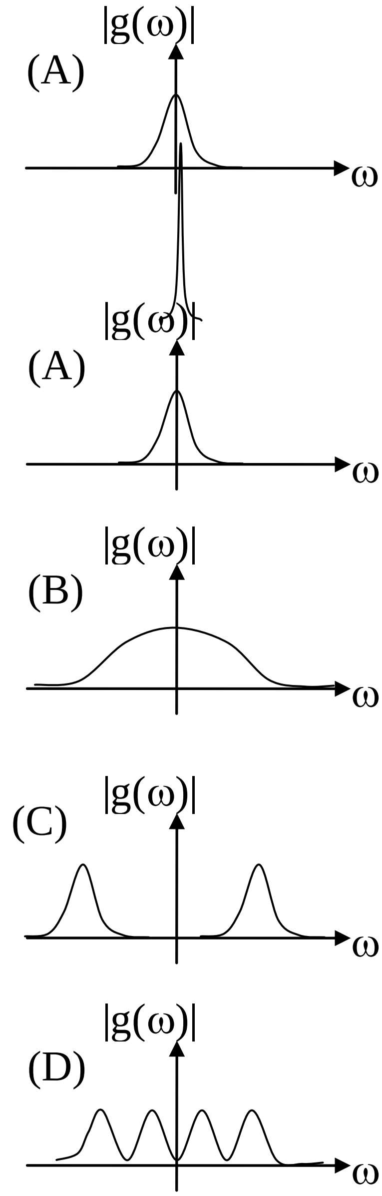
CT9-1. Match the function f(t) to the magnitude of it Fourier Transform $|g(\omega)|$:



CT9-2. Given that the Fourier Transform of the function f(t) is g(ω), we derived that the Fourier Transform of the time derivative f′(t) is iω g(ω). In other words, FT[f(t)]= g(ω) and FT[f′(t)]= iωg(ω). What is the Fourier Transform of the second time derivative f′′(t)?

A) FT[f′′(t)]= $i\omega^2 g(\omega)$
B) FT[f′′(t)]= iωg(ω)
C) FT[f′′(t)]= -ωg(ω)
D) FT[f′′(t)]= $\omega^2 g(\omega)$
E) FT[f′′(t)]= $-\omega^2 g(\omega)$

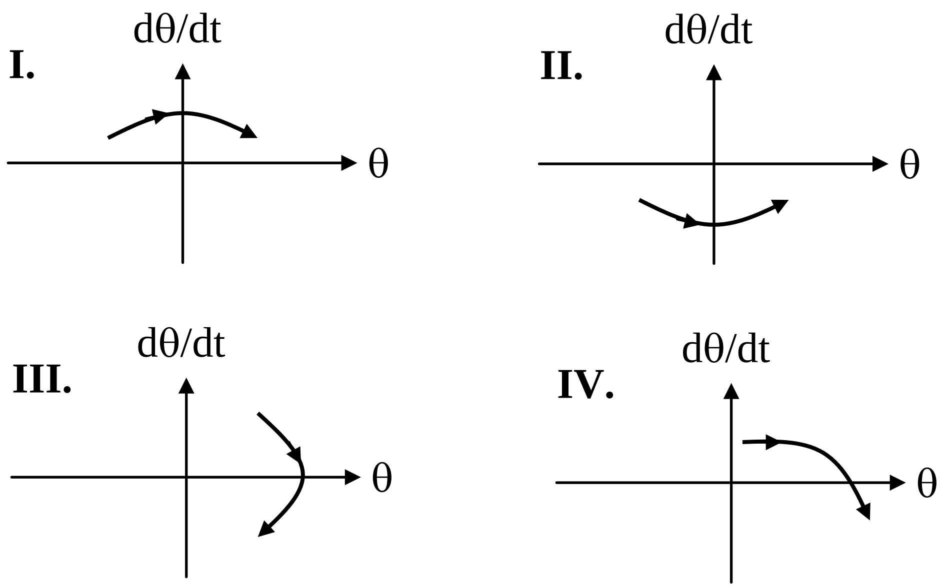
CT9-3. Given that the Fourier Transform of the function $x(t)$ is $g(\omega)$, we derived that the Fourier Transform of the time derivative $x'(t)$ is $i\omega\, g(\omega)$. In other words, $FT[x(t)] = g(\omega)$ and $FT[x'(t)] = i\omega g(\omega)$. What is the Fourier Transform of the following differential equation?

$$x'' + b\, x' + c\, x = 0$$

Assume b and c are positive constants.

A) $[\omega^2 - ib\omega + c]\, g(\omega) = 0$
B) $[-\omega^2 + ib\omega - c]\, g(\omega) = 0$
C) $[-\omega^2 + ib\omega + c]\, g(\omega) = 0$
D) $[ib\omega^2 - \omega + c]\, g(\omega) = 0$
E) $[-\omega^2 + ib\omega + c]\, g(\omega) = 0$

CT9-4. Review of phase diagrams. A driven, damped pendulum (DDP) has a phase diagram (or state space diagram) which is a plot of $d\theta/dt$ vs $\theta$. Which of the following trajectory portions are physically allowed in the phase diagram of a DDP?




A) All B) None C) I, II only D) I, III only E) I, III, IV only