Sinyal dan Sistem - ACP 3 - 24 Nov

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[4.1.1] What is the Fourier Transform representation of an aperiodic signal conceptually derived from?
A. Summation of exponential functions over finite intervals.
B. The limit of Fourier series representation of a periodic signal as its period becomes arbitrarily large.
C. Direct application of integration to any signal.
D. Convolution of the signal with a complex exponential.

[4.1.4] In the context of aperiodic signals, what is $X(j\omega)$ commonly referred to as?
A. The time-domain response
B. The frequency response
C. The spectrum of $x(t)$
D. The complex amplitude

[4.4.1] What is the fundamental relationship between time-domain convolution and frequency-domain multiplication for two signals $x(t)$ and $h(t)$?
A. $\mathcal{F}\{x(t) * h(t)\} = X(j\omega) + H(j\omega)$
B. $\mathcal{F}\{x(t) * h(t)\} = X(j\omega)H(j\omega)$
C. $\mathcal{F}\{x(t) * h(t)\} = X(j\omega)/H(j\omega)$
D. $\mathcal{F}\{x(t) * h(t)\} = X(j\omega) - H(j\omega)$

[4.1.7] What is the Fourier Transform of the unit impulse function $x(t) = \delta(t)$?
A. $\frac{1}{j\omega}$
B. 0
C. 1
D. $\delta(\omega)$

[4.4.4] For an LTI system to be stable, its impulse response $h(t)$ must satisfy which condition for the Fourier Transform $H(j\omega)$ to be guaranteed to exist?
A. $h(t)$ must be causal.
B. $h(t)$ must be absolutely integrable.
C. $h(t)$ must be periodic.
D. $h(t)$ must be an even function.

[4.1.10] What is the inverse relationship that exists between the time and frequency domains regarding signal width?
A. A broader signal in the time domain always results in a broader signal in the frequency domain.
B. A narrower signal in the time domain always results in a narrower signal in the frequency domain.
C. Broadening in one domain leads to narrowing in the other domain.
D. Signal width in one domain has no direct impact on the other.

[4.4.7] Why is an ideal lowpass filter generally not realizable in practice, especially for causal systems?
A. Its frequency response is too complex to build.
B. Its impulse response is not causal.
C. It has an infinite gain at low frequencies.
D. It requires infinite power.

[4.3.3] When a signal $x(t)$ is time-shifted to $x(t - t_0)$, what happens to the magnitude of its Fourier transform, $|X(j\omega)|$?
A. The magnitude is multiplied by $|t_0|$.
B. The magnitude is shifted by t_0.
C. The magnitude remains unchanged.
D. The magnitude is divided by t_0.

[4.5.3] When a signal $s(t)$ is multiplied by $p(t) = \cos(\omega_0 t)$ in the time domain, what effect does this typically have on the spectrum $S(j\omega)$ in the frequency domain?
A. The spectrum $S(j\omega)$ is compressed.
B. The spectrum $S(j\omega)$ is shifted to $\pm\omega_0$ and scaled.
C. The spectrum $S(j\omega)$ is inverted.
D. The spectrum $S(j\omega)$ becomes continuous.

[4.3.6] If $x(t) \overset{\mathcal{F}}{\longleftrightarrow} X(j\omega)$, what is the Fourier Transform of $x(at)$ for a nonzero real number a?
A. $aX(ja\omega)$
B. $\frac{1}{a}X(j\frac{\omega}{a})$
C. $\frac{1}{|a|}X(j\frac{\omega}{a})$
D. $|a|X(ja\omega)$