Signals and Systems

University Electrical Engineering · Vocabulary in context

Word	Example
signals and systems	**Signals and systems** links inputs, outputs and transformations.
signal /ˈsɪgnl/	A **signal** is a function of time, continuous or discrete.
system /ˈsɪstəm/	A **system** takes an input signal and gives an output signal.
linearity /lɪˈnɪərɪti/	**Linearity** means doubling the input doubles the output.
time invariance	**Time invariance** means a shifted input gives the same shifted output.
causality	**Causality** means the output never depends on future inputs.
BIBO stability	With **BIBO stability**, a bounded input always gives a bounded output.
linear time-invariant	A **linear time-invariant** system is fully described by its impulse response.
impulse response	The **impulse response** is the output when the input is a very short spike.
convolution	Flip, slide, multiply, then integrate to find continuous-time **convolution**.
Fourier transform	The **Fourier transform** carries a signal to its spectrum.

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time-bandwidth trade-off	The **time-bandwidth trade-off** pairs short pulses with wide spectra.
Nyquist criterion	The **Nyquist criterion** says sample at more than twice the highest frequency.
aliasing /ˈeɪlɪəsɪŋ/	**Aliasing** folds a high frequency into the band as a false low.
anti-alias filter	The **anti-alias filter** must sit before the sampler.
system function	The **system function** H(s) is the output divided by the input after transforming. H(s)
poles and zeros	**Poles and zeros** are denominator and numerator roots after cancellation.
frequency response	The **frequency response** shows how a system treats each frequency.
difference equation	The **difference equation** y[n] = 0.4y[n−1] + x[n] gives each new output sample. y[n] = 0.4y[n−1] + x[n]
z-transform	The **z-transform** sums samples weighted by powers of z^{-1}. z^{-1}
unit circle /ˈjuːnɪt ˈsɜːkl/	A **unit circle** has a radius of one.

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