Digital Signal Processing

University Electrical Engineering · Vocabulary in context

Word	Example
digital signal processing	**Digital signal processing** uses computers to work with sampled signals.
impulse response	For a zero-state LTI filter, its **impulse response** determines every output. LTI
convolution	Flip, slide, multiply, then integrate to find continuous-time **convolution**. ` `
causality	**Causality** means the output never depends on future inputs.
BIBO stability	An absolutely summable impulse response gives an LTI filter **BIBO stability**. LTI
frequency response	The **frequency response** shows how a system treats each frequency.
DTFT	The **DTFT** of a sampled signal repeats itself every two pi radians. two pi radians
DFT	The **DFT** turns N samples into N frequency-bin numbers a program can use. N N
leakage	Finite-window **leakage** can spread a tone across neighbouring DFT bins. DFT
resolution /ˌrezəˈluːʃn/	High **resolution** shows small details.

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FFT	**FFT** algorithms compute the DFT using fewer operations for large N. N DFT
butterfly	A radix-2 **butterfly** combines two branches using a twiddle factor. radix-2
twiddle factor	The **twiddle factor** is the complex root of unity that recombines the halves.
FIR	An **FIR** filter has a finite-length impulse response.
Hamming window	**Hamming window**ing trades a wider main lobe for lower sidelobes.
linear phase	**Linear phase** means constant group delay wherever phase is defined.
IIR	An **IIR** filter has an infinite-length impulse response.
bilinear transform	The **bilinear transform** maps stable analogue poles inside the unit circle.
prewarp	**Prewarp** a specified digital cutoff to compensate for bilinear frequency warping.
decimation	**Decimation** by M keeps every Mth sample after suitable anti-alias filtering. M M
interpolation /ɪnˌtɜːpəˈleɪʃn/	Use **interpolation** to estimate a value between two measured points.
polyphase	**Polyphase** splits filter coefficients into phases to avoid redundant calculations.

Word	Example
processing gain	**Processing gain** is how much a longer recording improves detection in noise.

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