

EECS 16B CSM

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Convolutions

Definition

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$$(f * g)[n] = \sum_{m \in \mathbb{Z}} f[m]g[n - m] \quad (1)$$

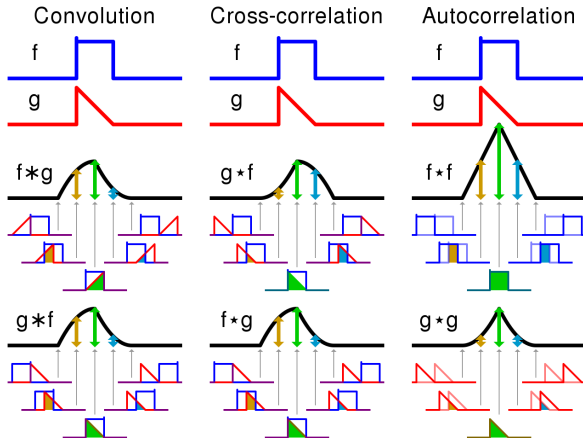
- only works with LTI systems
- "flip and drag" technique
- commutative, associative, distributive over addition

Convolutions

Visual

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Convolutions

Applications

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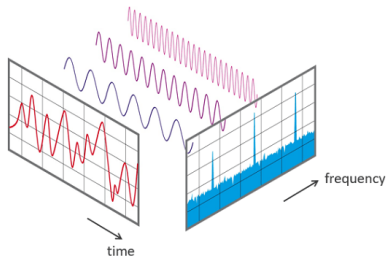


- 2D convolution
- image processing (edge detection)
- signal processing
- 3b1b guy on convolutions

Discrete Fourier Transform

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$$X(\omega) = \frac{1}{\sqrt{N}} \sum_{n \in [0, N-1]} x[n] e^{-j\omega n} \quad (2)$$

- splits up a signal into its constituent frequencies
- 3b1b video on CFT