## 1 Matlab Help on fft

FFT Discrete Fourier transform.
FFT(X) is the discrete Fourier transform (DFT) of vector X. For matrices, the FFT operation is applied to each column. For N-D arrays, the FFT operation operates on the first non-singleton dimension.

FFT(X,N) is the N-point FFT, padded with zeros if X has less than $N$ points and truncated if it has more.

FFT(X, [],DIM) or FFT(X,N,DIM) applies the FFT operation across the dimension DIM.

For length $N$ input vector x , the DFT is a length N vector X , with elements

N
$X(\mathrm{k})=\quad \operatorname{sum} \mathrm{x}(\mathrm{n}) * \exp (-j * 2 * \mathrm{pi} *(\mathrm{k}-1) *(\mathrm{n}-1) / \mathrm{N}), 1<=\mathrm{k}<=\mathrm{N}$. $\mathrm{n}=1$
The inverse DFT (computed by IFFT) is given by N
$\mathrm{x}(\mathrm{n})=(1 / \mathrm{N}) \operatorname{sum} \mathrm{X}(\mathrm{k}) * \exp (\mathrm{j} * 2 * \mathrm{pi} *(\mathrm{k}-1) *(\mathrm{n}-1) / \mathrm{N}), 1<=\mathrm{n}<=\mathrm{N}$. $\mathrm{k}=1$

See also fft2, fftn, fftshift, fftw, ifft, ifft2, ifftn.

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