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Fast Fourier Transform (FFT)

Open table with initial data and use Analysis → Fast Fourier Transform menu item to perform FFT.

Formulas

MagicPlot uses 'electrical engineering' convention to set the sign of the exponential phase factor of FFT. ¹⁾

Here c_n is signal components and C_n spectrum components, $n=1...N$.

| Normalize Check Box | Forward Transform (Signal→Spectrum) | Inverse Transform (Spectrum→Signal) |
|---------------------|--|---|
| Unchecked | $C_n = \sum_{k=1}^N c_k e^{-2\pi i k n / N}$ | $c_n = \frac{1}{N} \sum_{k=1}^N C_k e^{2\pi i k n / N}$ |
| Checked | $C_n = \sum_{k=1}^N c_k e^{-2\pi i k n / N}$ | $c_n = \sum_{k=1}^N C_k e^{\frac{1}{2}\pi i k n / N}$ |

Parameters

| | |
|------------------------------------|--|
| Sampling Interval | Sampling interval dt is used to compute the data in resulting sampling column which will be (if Center zero frequency is unchecked): $0, \frac{1}{dtN}, \frac{2}{dtN}, \dots, \frac{N-1}{dtN}$ |
| Real Imaginary | Columns with real and imaginary components of data. If your data is only real, select <all zeros> imaginary item |
| Forward Inverse | Transform direction |
| Normalize forward transform | Divide forward transform result by number of points N |
| Center zero frequency | If selected, after forward Fourier transform the two parts of spectrum will be rearranged so that the lower frequency components are in the center; the opposite rearrangement of spectrum will be done before inverse transform if any. |

¹⁾

Most scientific applications uses the same sign conventions. But note, that the sign of exponential phase factor in Numerical Receipts in C, 2nd edition, p. 503 is the opposite

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