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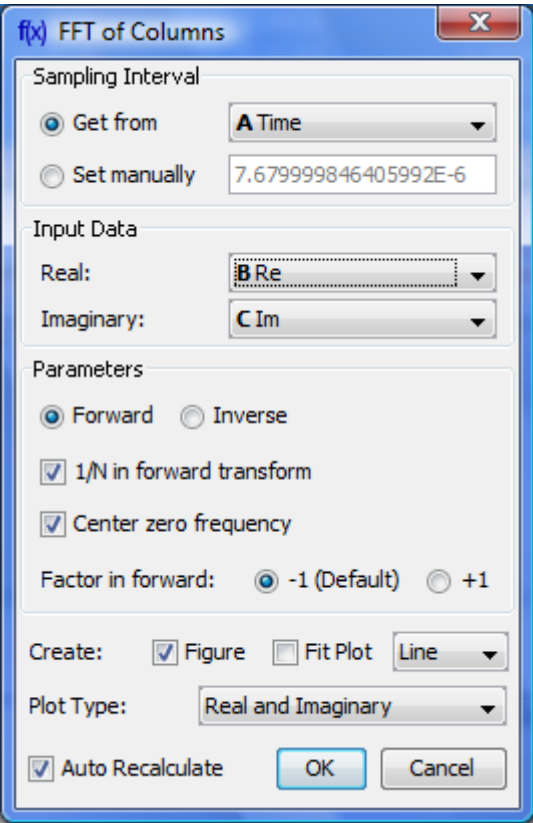
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# Fast Fourier Transform (FFT)

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 as follows from the table below.<sup>1)</sup>

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

Normalize Forward Transform	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	$C_n = \frac{1}{N} \sum_{k=1}^N c_k e^{-2\pi i k n / N}$	$c_n = \sum_{k=1}^N C_k e^{2\pi i k n / N}$

$$Phase_n = \arctan\left(\frac{2Im_n}{2Re_n}\right)$$

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): $0, \frac{1}{dtN}, \frac{2}{dtN}, \dots, \frac{N-1}{dtN}$
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<b>Real Imaginary</b>	Columns with real and imaginary components of data. If your data is only real, select <all zeros> imaginary item
<b>Forward Inverse</b>	Transform direction
<b>Normalize forward transform</b>	Divide forward transform result by number of points N
<b>Center zero frequency</b>	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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