

SET FOURIER EXPONENT

PURPOSE

Specify whether the Fourier transform is defined with a positive or negative exponent.

DESCRIPTION

DATAPLOT uses the following definitions for the discrete Fourier transform and the inverse Fourier transforms respectively:

$$H_n = \sum_{k=0}^{N-1} h_k e^{\frac{2\pi i k n}{N}} \quad (\text{EQ 10-64})$$

$$h_k = \frac{1}{N} \sum_{n=0}^{N-1} H_n e^{\frac{-2\pi i k n}{N}} \quad (\text{EQ 10-65})$$

Alternative definitions exist in the literature. Hence, these can also be defined as:

$$H_n = \frac{1}{N} \sum_{k=0}^{N-1} H_k e^{\frac{-2\pi i k n}{N}} \quad (\text{EQ 10-66})$$

$$h_k = \sum_{n=0}^{N-1} H_n e^{\frac{2\pi i k n}{N}} \quad (\text{EQ 10-67})$$

These formulas differ only in the sign of the exponent. The SET FOURIER EXPONENT command specifies which of these conventions is followed. This also applies to the fast Fourier transform and the inverse fast Fourier transform.

SYNTAX

SET FOURIER EXPONENT <+/->

where + specifies that the Fourier Transform has a positive exponent while - specifies that the Fourier Transform has a negative exponent.

EXAMPLES

SET FOURIER EXPONENT +
SET FOURIER EXPONENT -

DEFAULT

The Fourier transform has a positive exponent.

SYNONYMS

None

RELATED COMMANDS

FFT	=	Compute the Fast Fourier Transform.
FOURIER TRANSFORM	=	Compute the Fourier Transform.
INVERSE FFT	=	Compute the inverse Fast Fourier Transform.
INVERSE FOURIER TRANSFORM	=	Compute the inverse Fourier Transform.

APPLICATIONS

Fourier transforms

IMPLEMENTATION DATE

95/8 (earlier implementation of this command was not correct)