

Fourier Transform in Power System Relaying

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it should be noted that the coefficients in the equations above are given as follows. 3

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Introduction

The use of digital computers for power system relaying has been proposed long time ago in [1]. [Discrete Fourier transform](#) (DFT) was one of the first algorithms that have been proposed to be used in digital relaying. DFT has been the focus of many researched due to its simplicity and its relevant properties. Variations of the DFT have been proposed. This includes the short window, long window and the symmetrical component DFT [2]. DFT has many advantages compared to other types of transforms. In this short report the DFT will be reviewed. An emphasis will be given on the DFT as compared to the usual [Fourier transform](#). The use of DFT in relaying will be outlined and explained. The frequency response of the DFT will be sketched out and stressed. The report ends with the advantages and the disadvantages of the DFT used in power system relaying.

[Fourier Series](#), Continuous Transform and Discreet Transform

Fourier series has been proposed by Fourier in the late 18 century to deal with some mathematical heat problems [4]. Fourier insight was that any signal can be decomposed to periodic components in terms of trigonometric functions. Euler and Lagrange has shown before Fourier that periodic functions can be decomposed to such an expansion but Fourier's contribution has been in proposing that any function can be decomposed in such a way although he wasn't able to prove it [5]. It took almost one hundred years for mathematicians to prove that Fourier's claim was ...

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...erve to represent an arbitrary function between two given limits". Journal f"ur die reine und angewandte Mathematik, Vol. 4 (1829) p. 157–169.

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