

国家重点基础研究项目

基于递推离散傅里叶变换和同步采样的谐波电流实时检测方法

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摘要

目前普遍采用的谐波检测方法存在工频周期延时、计算量大等不足, 文章提出了一种基于离散傅里叶变换的快速谐波检测方法。该方法采用递推方式动态更新频谱, 并根据相位计算结果实时跟踪电网频率变化, 动态调整采样频率, 实现同步采样, 有效抑制了电网频率波动对检测精度的影响。4种不同情况的仿真实验结果表明, 该方法实现简单、计算量小, 能实时检测出基波与指定次谐波的参考指令电流。

关键词

[谐波检测](#); [有源电力滤波器\(APF\)](#); [同步采样](#); [递推离散傅里叶变换](#); [频率跟踪](#); [实时](#)

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A Real-Time Harmonic Current Detection Method Based on Recursive Discrete Fourier Transform and Synchronous Sampling

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Abstract

Dynamic compensation of the active power filter (APF) requires precise and real-time detection of the varying harmonic currents. To remedy the defects in nowadays generally used harmonic detection method based on fast Fourier transform (FFT) such as time delay of one complete power frequency period and heavy calculation burden, the author proposes a fast harmonic detection approach based on discrete Fourier transform (DFT). The proposed approach can dynamically update the frequency spectrum by use of recursive way, trace power system frequency variation in real-time mode according to phase calculation results, dynamically adjust sampling frequency and implement synchronous sampling, thus effectively restrains the impact of power system frequency fluctuation on detection accuracy. Simulation experiment results of four different situations show that the proposed approach is simple to realize, its calculation burden is light and the reference instruction currents of fundamental harmonic and harmonics of specified orders can be detected in real-time mode.

Key words

[harmonic detection](#); [active power filter \(APF\)](#); [synchronous sampling](#); [recursive discrete Fourier transform](#); [frequency tracking](#); [real time](#)

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