

A Method of De-noise and Harmonics Detection in Power System Based on Periodicity Analysis

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Abstract: A novel method of de-noise and harmonics detection is presented. Firstly, based on periodicity analysis of signals which have been detected, one minimum period signal with slight noise could be calculated. This signal is named as Standard unit-Period (SuP). Then a correction model is constructed based on SuP and 3-sigma rule, aiming to revise the rough harmonic signal. From the view of solutions, SNR could be risen about 15 dB in a high-SNR background. Furthermore, SuP could be applied to improve DFT in harmonic detection by adjusting the length of harmonic signal. It not only helps to avoid errors caused by spectral leakage effectively in particular situations, but also makes detection method run faster and more precise. At last, applications of SuP in several complex situations are simulated. It showed that SuP could deal with various coloured noise effectively, and this method could be used when the system fluctuates with changing parameters.

Keywords: Power system harmonic; Standard unit-Period; DFT; Periodicity analysis