

A FFT BASED HARMONIC ANALYZER ON TMS320F2812 DIGITAL SIGNAL CONTROLLER

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Abstract

Harmonics is basically frequency contents of a signal. Ideally, voltage and current waveforms are perfect sinusoids. However, because of the increased popularity of electronic and other non-linear loads, these waveforms quite often become distorted. This deviation from a perfect sine wave can be represented by harmonics—sinusoidal components having a frequency that is an integral multiple of the fundamental frequency. Harmonics in power systems is a subject of wide ramifications. Direct measurements are now widely made of harmonic levels for the purposes of confirming the extent of waveform distortion. Often, these assist in locating harmonic sources that may be of particular concern. Harmonic distortion is not a new phenomenon and widespread applications of power electronic-based loads continue to increase concerns over harmonic distortion. Harmonic problems have sparked research; that has led much of the present-day understanding of power quality problems.

Over the last couple of years, the number and variety of products that include some form of digital signal processing (DSP) has grown dramatically. This paper details the design and implementation of a harmonic analyzer for use in studying the harmonic content of power system. The same is designed for use in the study of harmonics on the mains supply line. The analyzer is a DSP based instrument that makes use of signal processing techniques. It samples the waveform and calculates the first 30 harmonics of the 50-Hz fundamental for both the voltage and current waveforms. The analyzer provides an inexpensive and accurate means of examining the harmonic content of an electric power system. The conceptions presented in this paper will be of assistance in the existing applications as well as in the design of new installations.