

FREQUENCY TRACKED PHASOR ESTIMATION ALGORITHM FOR PMU DURING OFF-NOMINAL FREQUENCY VARIATIONS

MUNUKUTLA NAGA CHAITANYA¹ & G. V. SIVA KRISHNA RAO²

¹Research Scholar, Department of Electrical Engineering, Andhra University, Visakhapatnam, Andhra Pradesh, India

²Professor, Department of Electrical Engineering, Andhra University, Visakhapatnam, Andhra Pradesh, India

ABSTRACT

Due to the increased penetration of distributed generators into the distribution system as well as due to various power electronic devices in the power network, there exists strong disturbances in electrical waveforms i.e., in amplitude, phase and frequency. These fluctuations need to be supervised and monitored for efficient energy management, safety and also protection purposes. Nowadays, this task is performed by Phasor Measurement Units (PMUs), which measure the phasor of voltage and current waveforms on a common timescale synchronized to the Coordinated Universal Time (UTC). Phasor Measurement Units (PMUs) are also expected to quickly measure fundamental frequencies and rate of change of such frequencies (ROCOF) by accurate parameter estimation algorithms. Although Discrete Fourier Transform (DFT) is the most commonly used phasor estimation algorithm, it fails when the signal frequency is varied from its nominal frequency. In practice the frequency of the power system cannot be maintained strictly at 50 Hz. It varies when power imbalance exists in the system. These variations have a significant effect on the phasor estimation. In this paper recursive DFT algorithm is modified to give a better performance during off-nominal frequency variations. Then the performance of the proposed algorithm is compared with Least Square Error (LSQ), RDFT algorithms, which are investigated in MATLAB environment.

KEYWORDS: Electrical Waveforms, Phasor Measurement Units, Phasor Estimation, Recursive DFT Algorithm

Received: Jan 02, 2016; **Accepted:** Jan 05, 2016; **Published:** Jan 13, 2016; **Paper Id.:** TJPRC: IJPSMJUN20161