



Madanapalle Institute of Technology & Science

(An Autonomous Institute affiliated to JNT University Ananthapur, Ananthapuramu-515002, Andhra Pradesh, India)

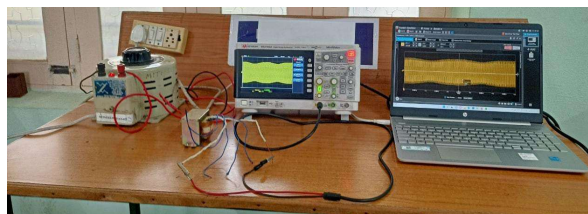
Department of Electrical and Electronics Engineering

Title	Identification of Power Quality Disturbances-A signal Processing Approach			
College & Department	Madanapalle Institute of Technology and Science & Electrical and Electronics Engineering			
Name of the Participants:	S. D. Mohammed Vaseem	Shaik Mahammed Yaseen	S. Karim Basha	S. Md. Yousuf

Aim: To Identify Power Quality Disturbances using signal processing techniques

Abstract: The Detection and Classification of Power Quality Disturbances (PQD) is important for quick diagnosis and mitigation of such disturbances. Poor power quality could have serious effects on sensitive electric devices. Consumers face difficulty to quantify the cost of failure equipment. There is a need to recognize and mitigate PQD to supply clean power to the consumer. In this Project PQDs simulated with MATLAB R2022b to be validated experimentally on a test bench using step-down transformer.

Test Bench:



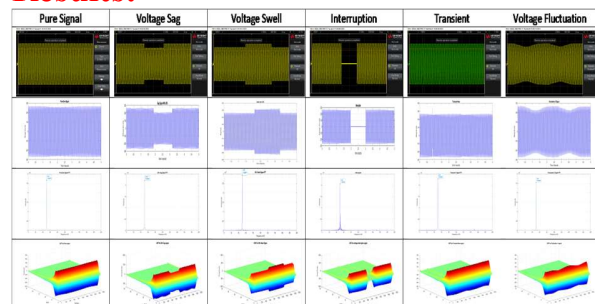
Tools and Platform:

TOOLS AND PLATFORM	SPECIFICATIONS
Step down Transformer	3V/6V/9V/15V/18V, 1A, 50HZ
KeySight Oscilloscope	EDUX1002A
Voltage Probe	1:10
USB Cable	USB-A to USB-B
Keysight i/o libraries	Software
MATLAB R2022b	Software
Laptop	Installed with MATLAB

Head:

Working: In this Project, the test bench is created to experimentally simulate the PQD events on 230V, 50 Hz, single phase, step-down transformer with outputs tapped at 3V, 6V, 12V, 15V and 18V with 3A current rating is demonstrated in Fig .The signals are acquired by a 10:1 voltage probe and is connected to Keysight-EDUX1002A oscilloscope. The data is captured and visualized in Laptop screen by Keysight I/O libraries tool. The procured signals are processed by Fast Fourier Transform (FFT), Continuous Wavelet Transform (CWT) based Signal Processing in MATLAB R2022b for identifying the PQD.

Results:



In the above picture the Real time signals acquired from the test bench is presented both in oscilloscope snapshot and MATLAB processed signals and the FFT and CWT of the signals is analyzed for analyzing the PQD in the signal.

Conclusion:

In this Project the role of signal processing techniques Fast Fourier Transform (FFT) and Continuous Wavelet Transform (CWT) to detect the occurrence and diagnose the Power Quality Disturbances (PQD) reported in the power system. The study has been carried out by simulating PQDs with MATLAB R2022b and validated experimentally on a test bench using step down transformer and the various PQD's are acquired using various techniques. The signal processing approach i.e. FFT and CWT is simpler requiring less computation complexity, though it demands 2D, 3D visualizations display facility. The Amplitude, time and frequency information can be obtained while detecting PQD.

Future Scope:

The detection of Power Quality Disturbances (PQD) plays a vital role in quick diagnosis and mitigation of PQD. In this project the identification of PQD is done by implementing signal processing approach i.e. FFT and CWT which gives the Amplitude, time and frequency information as well as 2D and 3D view of the signal. However the identification is done Manually i.e. by analysing the signal. The future research trend would involve PQD detection and classification using intelligence techniques like Neural Networks and Machine learning.