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**INVESTIGATION OF HARMONIC CHARACTERISTIC OF  
NONLINEAR LOAD IN POWER DISTRIBUTION SYSTEM**

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**In the name of ALLAH  
Most Gracious and Most Merciful**

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## **ABSTRACT**

Power systems are designed to operate at frequencies of 50 or 60Hz. However, certain types of loads produce currents and voltages with frequencies that are integer multiples of the 50 or 60 Hz fundamental frequency. These higher frequencies are a form of electrical pollution known as power system harmonics. Harmonics can lead to power system inefficiency. Some of the negative ways that harmonics may affect plant equipment such as overheating of transformer, increasing the errors in measuring instruments and etc

This project report presents an analysis of harmonic distortion of a power system with various types of harmonic loads. The harmonics theory definition of harmonics quantities, related harmonic problems in power electronic system are explained. Also the connection of single phase half wave uncontrolled rectifier, single phase full wave uncontrolled rectifier, single phase half wave controlled rectifier, single phase full wave controlled rectifier, three phase half wave uncontrolled rectifier, three phase full wave uncontrolled rectifier, three phase half wave controlled rectifier, and three phase full wave controlled rectifier.

This project will utilize concept of FFT analysis in MATLAB/SIMULINK to differentiate the total harmonic distortion. The study explores the output of single phase and three phase circuit using MATLAB/SIMULINK. Comparison was made in order to determine and analysis the total harmonic distortion.

Results obtained by simulation with MATLAB/SIMULINK are represented to prove the suitability of harmonic detection method for various type of nonlinear load.

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