

## **Abstract**

In present scenario, both industrial and commercial customers of electrical utilities have reported more occurrences of power quality problems. A power quality problem can be most described as any variation in the electrical power supply, such as voltage dips and fluctuations, momentary interruptions, harmonics and transients, resulting in mis-operation or failure of end-use equipment. Therefore mentioned disturbances, degrading the reliability and quality of power supply, though always existed on utility supply, are, nowadays, causing more and more troubles. This is due to increased refinement of today's automated equipment, such as variable-speed drives or robots, automated production lines or machine tools, programmable logic controllers or power supplies in computers. They are far more vulnerable to disturbances on the utility supply than previous generation electro mechanical equipments and previous less automated production and information systems.

The load exerted by harmonics on the power network infrastructure has increased dramatically over the past few years. Harmonic currents are caused by nonlinear loads. A nonlinear load is a consumer of electricity that draws non sinusoidal current from supply network when supplied with a sinusoidal voltage. These harmonics flow in addition to the active sine wave, generate additional losses in electrical installations, and can result in thermal over load.

Due to these reasons the need of power quality monitoring and analysis for both customers and electrical utilities is strongly increasing. As customers seek to increase utilization and efficiency, utilities strive to better understand power quality parameters and their effects on customers.

Power quality monitoring and analysis must be able to detect, measure and track disturbances on the supply line. The algorithms use to perform these tasks must be able to operate in sinusoidal and non-sinusoidal conditions. The signal processing techniques applied must be fast, accurate and able to be deployed on a hardware platform.

This thesis describes various algorithms used for detection of various power quality parameters, its mathematical modeling, simulation and implementation on DSP hardware.