**ABSTRACT**

The solar photovoltaic (PV) system uses solar energy to produce electricity and is one of the major renewable energy sources. It has been developing in technologies and investments rapidly compared to others renewable and traditional energies. In this project we are going to develop a complete computer simulation program of a grid-connected solar PV system in distribution power network using MATLAB/Simulink and SIM Power System tool. . This project aims to grid-connected solar pv system at steady state and also to study their transient responses to changing inputs. Currently models of a Solar Photo voltaic module and Power conditioning unit have been developed.

In the solar PV modeling a circuit-based simulation model for a PV cell in order to allow estimate the electrical behavior of the cell with respect to changes on environmental parameter of temperature and irradiance. The power conditioning unit consists of a DC-DC Boost Converter and a full-bridge inverter. The DC-DC Boost Converter implements a Sensor less Maximum Power Point Tracker (MPPT) algorithm with regulated DC bus voltage while the full-bridge inverter implements a Hysteresis Current Control as the control method. These control method provides robust current regulation, achieve unity power factor and optimize the PV energy extraction suitable for grid connected PV systems. In this simulation model the power responses of load and utility grid are discussed by varying the load.