# ABSTRACT

Renewable energy sources have been successfully exploited to claim their due share in the national energy mix of Pakistan. Solar PV solution is in line with the conditions prevalent in Pakistan. However the challenges include; expense of installation, inconsistency, nonlinear behavior and conversion efficiency. In this thesis, for optimization of power generation an efficient algorithm for photovoltaic system was designed. Analysis of different techniques for maximum power point tracking (MPPT) is presented and comprehensive design of the PV inverter system is also incorporated. The number of switches has been reduced for optimal power generation. Similarly a technical inter- comparison has been made with the existing topologies. MATLAB/Simulink was used to characterize solar PV characteristics at various irradiance and temperatures profile. Furthermore, the simulation results agree well with designed version in terms of PV panel efficiency.