ABSTRACT

DC-DC converters are widely utilized in various medical apparatus, telecommunication network, power supply for computer peripheral devices, power supply for high speed data transfer device in robot systems, power supply for mobile phones, renewable energy power systems, traction motor control in electric automobiles, industrial applications, military applications and many more. For the period of current scenario, DC chopper technology have been built to achieve high voltage gain, improved efficiency, more power density and effortless circuit arrangement. CUK converter, SEPIC converter, KY converter are few examples for such developments.

Power converters are worthy with different models in their operating cycles, where the participating switches and components for every mode are unique. The fundamental working inside the modes and transition between modes are variable structure control in nature. Any effective non linear robust control approach applicable to variable structure control can be used in the power converter based systems. The main goal is being selecting a controller has confirming stability in every working stage of the converter just as offering quick initial startup and enhanced dynamic responses (line variations and load variations), reduce the effect of component variation etc. offer.

The main aim of this research work is to design, analysis and implementation of parallel boost converter for power factor correction, solar PV systems and positive output elementary system with sliding mode control. The operation of the positive output elementary converter is operated in continuous conduction mode. The boost converter for different operating conditions with suitable model and compare their performance with classical
linear controller, PI controller and sliding mode controller etc. Among these controllers, sliding mode controller gives a fast as well as precise result. Sliding mode controller also created the system response not sensitive to alters in the system components and load interruptions. The parallel boost converter based power factor correction, parallel boost converter based solar PV and parallel boost converter based positive output elementary has been analyzed in this research work with the help of MATLAB/Simulink. The laboratory prototype of the positive output elementary parallel boost converter is constructed and their controller is implemented in simple analog platform.