ABSTRACT

Switched Reluctance Motors has been the growing interest in the comparative merits of heavy loads used in variable speed and propulsion applications in industries, railways, aircrafts etc. that have been integrated into the hybrid electrical power system. The advantages of Switched Reluctance Motor (SRM) include simple structure, robust, low cost, ability to operate in high temperatures and also beneath limited hardware failures.

Renewable energy resources will be an increasingly important part of power generation in the reduction of green houses gases thereby decreasing the fossil fuels. Among the renewable energy resources, solar energy is the most essential and prerequisite resources of sustainable energy because of its abundance and sustainability. Recently photovoltaic (PV) system is well recognized and widely utilized to convert solar energy into electric power applications. It can generate direct current electricity without environmental impact and emission by way of solar radiation.

Introduction of direct current electricity to heavy load applications such as switched reluctance motor drives through the source of sunlight is an interesting phenomenon. The objective of this research is to study the various converter techniques that are used and compared for performing photovoltaic driven hybrid Switched Reluctance Motor (SRM) using MATLAB. The main objectives of this work are

1. To develop a topology of solar assisted high speed drives.
2. To propose the simple, reliable and continuous power supply to stand-alone SRM.

3. To develop a control strategy that is integrated from machine parameter variation and to evaluate a method for the steady state predetermination procedure for standalone SRM system.

4. For utilizing the solar energy efficiently, operating stand-alone SRM with battery charging model has been proposed.

5. To compare the performance of the proposed PVSRM-battery system using different converter topologies on the basis of phase current waveform and angular speed Using MATLAB.

Among the different converters implemented to standalone photovoltaic fed Switched Reluctance Motor (PVSRM), the results indicate that the asymmetric bridge converter yields a better classification performance and also found that it is most suitable for high speed applications because it has less fall times of current as compared to other converter topologies and less shoot through faults in this topology also. The comparative merits and demerits of the various converters are also discussed. It is hoped that this research will pave the way for an extensive follow-up research studies in this direction. Also it will serve as a useful guide for the designers and users of solar energy conversion system employing SRM power electronic converter battery systems in the field of renewable energy sources.