ABSTRACT

This project proposes a MATLAB based cost effective and efficient Brush Less DC (BLDC) motor drive for Solar Photovoltaic (SPV) array fed water pumping system. A CUK converter is utilized in order to extract the maximum available power from the SPV array. The proposed control algorithm eliminates phase current sensors and adapts a fundamental frequency switching of the voltage source inverter (VSI), thus avoiding the power losses due to high frequency switching. No additional control or circuitry is used for speed control of the BLDC motor. The speed is controlled through a variable DC link voltage of VSI. An appropriate control of CUK converter through the Incremental Conductance Maximum Power Point Tracking (INC-MPPT) algorithm offers soft starting of the BLDC motor. The proposed BLDC motor system is designed and modeled such that the performance is not affected under dynamic conditions. In the advanced Proposed prototype, pulses to the BLDC Device circuit can be triggered and varied by IoT Modem. The IoT pulses can be varied from anywhere to have a smart application. The suitability of proposed system at practical operating conditions is demonstrated through simulation results using MATLAB/Simulink followed by an experimental validation.