

Article Tuning of PID controller for a PV-fed BLDC motor using PSO and TLBO algorithm

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Nowadays BLDC motors are very popular in applications, such as Automobiles, Water pumping which uses solar energy as a main source of energy along with a battery. Wide speed range operation of BLDC motor is very important in Electric vehicle applications. In this work Zeta converter is used to track the maximum power from the PV panel. In order to attain the high efficiency, the PV should be operated at the maximum power point. To track the optimum power from the PV panel, this work uses optimization algorithms such as particle swarm optimization and teaching learning-based optimization to vary the duty cycle of the Zeta converter. Since the solar power is not available throughout the day a battery is connected in parallel through the bidirectional DC-DC converter. Therefore, the battery gets charged through the bidirectional buck boost converter when the solar power is more than the demand. The battery discharges when solar power is lesser than the need. The characteristics of wide speed range of BLDC motor are very much useful in electric vehicle applications. PI controller controls the speed of the BLDC motor. This research work focuses on modelling of PV panel, Optimization algorithms for the tuning of

Zeta converter, design of Multilevel inverter and an FPGA-based controller of BLDC motor for an Electric vehicle application. MATLAB-SIMULINK software is used to carry out the simulation. Real-time hardware integration is developed, tested and the results are verified.

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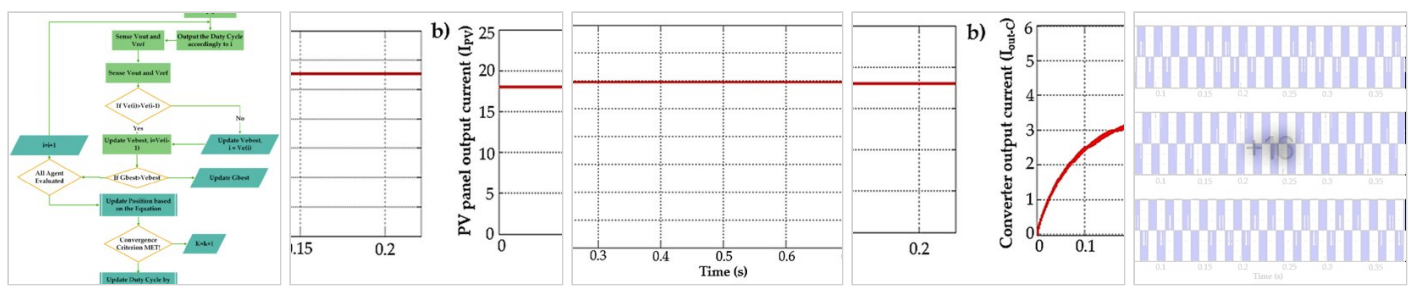
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