ABSTRACT

This project proposes a new single-input three-output DC-DC buck converter. The proposed topology has two less switching devices than that of a conventional converter. This reduction in switching devices results in lower cost and a more even distribution of power losses among the switching devices. A comprehensive small signal modelling and control strategies for the proposed converter will be presented. Simulation and experimental results are presented to validate the theoretical expectations. The simulation is performed using MATLAB, and the laboratory experiment is performed with a proof-of-concept prototype. The Super Lift Luo Converter (SLLC) is a highly efficient DC-DC power conversion topology, particularly suited for Electric Vehicle (EV) charging systems. This abstract explores the design, functionality, and advantages of integrating the SLLC into EV chargers to enhance performance and reliability. The SLLC employs a series of voltage-lifting techniques that provide ultra-high voltage gain with reduced component stress and improved efficiency. Its inherent ability to minimize Electromagnetic Interference (EMI) and accommodate high input-to-output voltage ratios makes it an ideal choice for interfacing with renewable energy sources and grid-connected systems. Furthermore, the converter ensures stable operation across a wide range of load conditions, essential for EV charging stations with variable demand.