IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 1, September 2023

A Study on Battery-Integrated Multiple Input DC-DC Boost Converters

Rohit Khandu Jarande[1], Anurag Koteshwarrao Pallepogu[2], Chinmay Rajesh Ghodke[3], Ashwin Satish Jadhav[4], Jatin Shailesh Chaudhari[5], Sarthak Anna Shende[6]
Students, Third Year Electrical Engineering
Jawaharlal Darda Institute of Engineering and Technology Yavatmal, India[123456]
jaranderohit41@gmail.com[1], anuragpallepogu1234@gmail.com[2], chinmayghodke4@gmail.com[3], ashwinsjadhav1427@gmail.com[4], chaudharijatin79@gmail.com[5], sarthakshende123@gmail.com[6]

Abstract: *The increasing demand for portable electronic devices and renewable energy systems has driven the need for efficient and versatile power conversion solutions. This research paper presents a comprehensive study on battery-integrated multiple input DC-DC boost converters, which serve as a critical component in various applications, including electric vehicles, renewable energy systems, and portable electronics. The primary objective of this study is to investigate the design, modelling , control strategies, and performance analysis of multiple input DC-DC boost converters that incorporate energy storage elements such as batteries. The research explores various converter topologies, including interleaved boost converters, multi-input converters, and bidirectional converters, in combination with energy storage to enhance overall system efficiency, flexibility, and reliability.*

Key aspects of the research include: DC-DC booster conveter.

1. Converter Topology Analysis: A thorough examination of different multiple input DC-DC boost converter topologies, highlighting their advantages and limitations in various applications.

2. Modeling and Simulation: Development of mathematical models and simulation tools to accurately predict the behavior and performance of battery-integrated multiple input converters under various operating conditions.

3. Control Strategies: Investigation of advanced control techniques to optimize the operation of these converters, ensuring seamless energy flow between multiple input sources and the battery, while maintaining stable output voltage and current levels.

4. Efficiency and Reliability: Evaluation of the efficiency and reliability of battery-integrated converters, considering factors such as component selection, thermal management, and transient response.

5. Applications and Case Studies: Real-world case studies and application examples to demonstrate the practicality and effectiveness of these converters in specific scenarios, such as electric vehicles and renewable energy integration.

6. Future Trends and Challenges: Discussion of emerging trends and challenges in the field of battery-integrated power conversion, including advancements in wide-bandgap semiconductor technology and integration with emerging battery chemistries.

The findings of this research are expected to contribute significantly to the development of more efficient and versatile power conversion solutions, promoting the widespread adoption of renewable energy sources and the integration of batteries in various electronic systems. Moreover, the insights gained from this study will aid in addressing the evolving demands of modern energy-efficient applications while addressing key challenges in power electronics and energy management.

Keywords: DC-DC booster conveter