National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: A Comprehensive Analyses of Single-Phase Grid-tied Bidirectional Electric Vehicle Charger
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Venue	: Seminar room (EE department)
Date and Time	: 30 Dec 2024 (05:30 PM)
Abstract	: Overview of Presentation: This work proposed a dual control technique that uses predictive power control (PPC) on the rectifier side and new predictive duty cycle control (PDCC) on the dual active bridge (DAB) side to improve grid power quality (PQ) and charge electric vehicles (EVs), respectively. Additionally, it features an EV charger that supports bidirectional power flow. The proposed bidirectional electric car charger works in gridto- vehicle (G2V) and vehicle-to-grid (V2G) modes. In G2V mode, also known as charging mode, the vehicle's battery receives electricity from the utility grid. In V2G mode, also known as discharging mode, the battery delivers power back to the grid. The proposed bidirectional EV charger (BEVC) exhibits a rapid dynamic response attributed to the efficient management of the battery current. Regulating the transformer winding current peak value is essential for maintaining symmetry. Furthermore, a voltage estimation scheme is integrated into the PPC algorithm, enabling sensorless operation for grid voltage. This regulation of the current minimizes the DC bias present in the transformer current. The BEVC is designed and simulated for a peak power of 0.5kW. Simulated results from MATLAB are presented for the G2V and V2G modes of operation of a 48V, 80 Ah battery.