
Seminar Title	: Design and Development of Single-Phase EV Charger
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Abstract	: Globally, increasing EV adoption is essential for decarbonizing the transport sector. India is one of the supporting countries of global 30@30 campaign aiming for 30% new vehicle sales to be electric by 2030. India's NITI Aayog plans ambitious EV sales targets by 2030: 80% for two-wheelers, 70% for commercial cars, 40% for buses, and 30% for private vehicles. Light EVs (LEVs) include low voltage two- and three-wheelers. So, this work focusses on making a single-phase integrated PV based EV charger. In the present work a detailed analysis of the PWM rectifier with different modulation technique such as bipolar pulse width modulation (BPWM), unipolar pulse width modulation (UPWM) and hybrid pulse width modulation (HPWM) has been done. The working principle of PWM rectifier with bipolar modulation (BPWM) has been explained. Then, it's modelling and small signal analysis has been done for the closed loop operation of the rectifier. Next the working of the rectifier with UPWM has been explained and it's modelling and small signal analysis has been done for its closed loop operation. Finally, the working of the rectifier with HPWM technique has been explained and the corresponding modelling and small signal analysis is done for its closed loop operation. Then an explanation of the closed loop controller for the PWM rectifier for controlling the dc link voltage has been given and a single-phase PWM rectifier is simulated using MATLAB Simulink to control the dc link voltage. The simulation is done by implementing all the above three PWM techniques to the rectifier and it has been found that HPWM gives better result with less THD and better power factor as compared to BPWM and UPWM. Then the working of a dc/dc converter has been explained and the modelling and small signal analysis has been done for the closed loop operation of the dc/dc converter. After that the working of CCCV charge controller has been explained. Finally, the PWM rectifier and the dc/dc converter are integrated together to make a 3kW charger using MATLAB Simulink.