

## **Abstract**

**O**ne of the Active Power Line Conditioner devices on the consumer side, which is used for voltage sag mitigation, is Dynamic Voltage Restorer (DVR). A DVR has three main sections which are; Energy Storage (DC side), DC-AC Inverter and Control System. In this thesis a general description on different parts of a DVR and its control strategies is given. Then a conventional DVR structure consist of a three phase Diode Rectifier and a 6 switches three phase Voltage Source Inverter (VSI), is designed. This structure is controlled by following methods; Feed Forward control and Feedback control along with SVM switching method and a control system based on Hysteresis band switching strategy. The main disadvantages of these hard wares are uncontrollable DC link Voltage and a non-sinusoidal input current drawing from network. In the next step a new DVR hard ware structure consisting a three phase Boost Rectifier and a conventional 6 switches VSI is proposed. The simulation results show that the better voltage sag compensation and drawing almost a sinusoidal current from network are the main advantages of the proposed circuit. It's also shown that switching methods applied to the conventional 6 switches VSI can also compensate the zero sequence component of feeder voltage under voltage sag condition. In all of the simulations the voltage sag is detected using a software phase locked loop (SPLL) and also the voltage compensation strategy is In-Phase one. Simulations are carried out by using MATLAB-SIMULINK software.

**Keywords:** Voltage Sag, Dynamic Voltage Restorer, Space Vector Modulation, Hysteresis Band Switching, Boost Rectifier