

# Design and Real Time Implementation of Three-Phase Three Switches Three Levels Vienna Rectifier Based on Intelligent Controllers

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**Abstract:** This paper treats the control of multilevel rectifier by applying the soft computing technique represented by the fuzzy logic. This latest, provides an inexpensive solution for controlling the ill-known complex systems, while relying on the imitation of human reasoning. In our case, the proposed intelligent controller aims at eliminating the current line harmonics, guaranteeing an improved power factor, reducing the output voltage ripple and ensuring the balance between the two voltages across the two capacitors of Vienna rectifier. In order to evaluate the performance of the proposed control for Vienna rectifier, a comparative study in real time via the dSPACE card 1104 has been carried out between the traditional approach based on the conventional controllers and the new method using an intelligent controller. The experimental results confirm that the modified control approach has guaranteed a good quality of source currents in phase with the grid voltages and operation of the studied system with a power factor very close to unity. Furthermore, only one fuzzy controller used has ensured the regulation of the DC bus voltage, the minimization of the undulations for the two partial voltages and the improvement of the error of the voltage balance for the Vienna rectifier.

**Keywords :** Vienna rectifier, Fuzzy logic controller, DC bus voltage ripple, Total harmonic distortion, Power factor correction