ABSTRACT

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This dissertation presents some selective active filter control algorithms connected in a three-phase three-wire electrical grid, which consist of improvements when compared to the control strategies presented in the literature, taking into account the limited capacity of the energy converter to fully compensate for the selected harmonic current. Firstly, the measurement point that enabled the suppression of the harmonic component present in the grid current was chosen. For this purpose, the reference currents determined according to the voltages of the common coupling point were compared with the reference currents determined according to the grid current. Although the limitations, the result obtained by having the control as a function of the tension at the common coupling point, was the first contribution of this work. Therefore, the other algorithms aim to close the gap presented in the full compensation algorithm with control as a function of the grid current. Regarding the proposed methods, they aim to control the harmonic amplitude of the selected component,by means of the control based on the *pq* theory combined with the harmonic component tracking algorithms, of the control based on the Enhanced Phase-Locked-Loop synchronism circuit, was presented, of the control based on optimization algorithms and, finally, of control based on filtering techniques. Simulation results were provided in order to evaluate the performance of these algorithms in the aforementioned conditions.

Keywords: Selective Active Filter; Selective Suppression; Harmonic Compensation.