

A novel control for a static shunt compensator to improve power quality

Applications

Applications for this technique are found in electric power stations and industrial electric consumers

Problem addressed

The degradation of the power quality in distributed power grids caused by a massive integration of nonlinear devices has detrimental consequences on the proper functioning of electrical appliances and incurs an additional cost for the installations. Current solutions to improve the power quality and enhance the grid performance don't take into consideration the real case of distorted and unbalanced grid voltages, and their validity is only limited for specific operating conditions.

Technology

The novel Direct Control for Active Power (DCAP) is based on the concept of instantaneous active power and on the computation of the effective value of the fundamental of the source voltages. It can be easily generalized to multiphase systems particularly in three phase 3-wire, three-phase 4-wire and in single phase networks. The general approach for multiphase system has been the subject of a patent. The obtained results demonstrate the superiority of the DCAP control method over the reported control techniques in terms of unbalance factor and current Total Harmonic Distortion during a distorted source voltage operation.

Advantages

- Better current THD in distorted and unbalanced source voltage mode
- Better power factor at the point of common coupling
- Reactive power compensation
- Lower electromagnetic interference (EMI)
- Extendibility to multiphase systems

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