

Collaborative Energy Transfer Between D-STATCOM and Electrical Network During Voltage Fluctuations

Rachid. Dehini

Department of Electrical Engineering ,Faculty of technology, Mohamed Tahri University, B.P 417 Bechar (08000), Algeria

Glaoui Hachemi

Department of Electrical Engineering ,Faculty of technology, Mohamed Tahri University, B.P 417 Bechar (08000), Algeria

Abstract:

This paper examines how the Distribution Static Compensator (D-STATCOM) can work with the distribution network to combat voltage issues like sags and swells through coordinated reactive power management. Maintaining stable voltages and power factors is increasingly crucial as sensitive loads proliferate and economies rely on steady power quality. The D-STATCOM utilizes bidirectional energy flow to actively compensate fluctuating loads, keeping voltages and power factors within acceptable ranges during disturbances. This facilitates uninterrupted operations and mitigates equipment troubles stemming from unsatisfactory power quality.

The power system's stability was evaluated under varying conditions through meticulous active and reactive power examinations. The theoretical models were confirmed through simulations, illustrating how the D-STATCOM skillfully absorbs or injects the requisite active and non-active energy to uphold a steady operational standard. By counteracting deviations and covering reactive demands across an assortment of functional states, the D-STATCOM efficiently safeguarded voltage quality and stability.

Keywords:

Power Quality, Voltage Sag, Voltage Swell, D-STATCOM, Reactive Power Compensation.