

Control system for a PWM-based STATCOM

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Abstract-

The always-increasing switching frequency of modern solid-state power switches together with the application of multi-converter topologies, make it possible to use Pulse Width Modulation (PWM) in high power applications of STATCOMs (STATIC Synchronous COMPensators). This paper proposes and details a control system for a PWM-based STATCOM. First of all, a discrete-time model of the STATCOM is derived to take into account the discrete-time implementation of the controller. Secondly, the control algorithm is detailed. It ensures decoupled control of the real and reactive power exchange between the power converter and the electric-energy system. This is necessary to control the d.c. capacitor voltage during transients of the exchanged reactive power. Finally, the control of the capacitor voltage is explained in detail. The controller is tailored to keep the capacitor voltage almost constant in spite of the fast control of the reactive power. This helps to reduce the capacitor size significantly. The main contributions will be illustrated using a 15kVA laboratory prototype.

Index Terms- STATCOM, reactive power compensator, PWM inverter

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