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电力系统

静止同步串联补偿器的恒阻抗模型及其双闭环控制策略

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摘要：

考虑到静止同步串联补偿器(static synchronous series compensator，SSSC)输出电压相位与线路电流相位的垂直关系、逆变器的损耗以及直流侧电容电压的波动过程，在两相同步旋转d-q坐标系下建立SSSC的恒阻抗模型。在分析此模型的基础上提出SSSC的双闭环控制策略，即电容电压控制和线路阻抗控制。在电容电压控制环中，选取SSSC为控制对象，电容电压为控制目标；在阻抗控制环中，选取含SSSC的输电线路为控制对象，线路阻抗为控制目标。在Matlab/Simulink动态仿真环境中搭建SSSC的恒阻抗模型及控制系统的仿真模型，并对线路阻抗的调节过程和电容电压的变化过程进行仿真，仿真结果证明了所建立模型和所提出控制策略的有效性和实用性。

关键词：

Constant-Impedance Model of Static Synchronous Series Compensator and Its Double Closed Loop Control Strategy

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Abstract:

Considering the fact that the phase of output voltage of static synchronous series compensator (SSSC) is at right angles with line current, the loss of inverters and the voltage fluctuation of capacitors at DC side, a constant- impedance model of SSSC is built in d-q coordinate system. On the basis of analyzing this model, a double closed loop control strategy, i.e., the capacitor voltage control and line impedance control, is proposed. In the control loop of capacitor voltage, the SSSC is chosen as controlled object and the capacitor voltage as the control objective; in the control loop of impedance, the transmission line containing SSSC is chosen as controlled object and impedance of transmission line as control objective. In the dynamic simulation environment of Matlab/ Simulink, the constant-impedance model of SSSC and simulative model of control system are set up, then both regulating process of impedance of transmission line and the variation of capacitor voltage are simulated. Simulation results show that the built model and the proposed control strategy are effective and available.

Keywords:

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