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电力系统

静止同步补偿装置与发电机励磁的无源协调反步控制设计

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摘要：

针对具有静止同步补偿装置(static synchronous compensator，STATCOM)的单机无穷大系统，研究了发电机励磁无源协调控制，采用耗散性和无源性理论的反步设计方法构造了系统的存储函数。根据协调无源性的特点，得到了STATCOM与发电机励磁协调控制器，使得系统在STATCOM和励磁的共同作用下，保持系统功角和电压的稳定。设计过程充分利用了系统的非线性性质，不采用任何线性化的处理，保证了所提出的控制律在非线性系统中的适用性，并有效地提高了电力系统的暂态稳定性能。仿真结果证实了该控制律的有效性和正确性。

关键词：

Coordinated Control for STATCOM and Generator Excitation Based on Passivity and Backstepping Technique

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Abstract:

In allusion to the single machine infinite bus system with static synchronous compensator (STATCOM), the passive coordinated control of generator excitation is researched, and the storage function of the system is constructed by backstepping technique based on dissipativity theory and passivity theory. According to the features of coordinated passivity, the coordinated controllers for STATCOM and generator excitation are attained, thus under the combined action of STATCOM and generator excitation the stability of both angle and voltage can be maintained. In the design process the nonlinear characteristics of the system are fully utilized and any linearization processing is not adopted, thus the applicability of the proposed control law in nonlinear system is ensured and the transient stability performance of power system can be effectively improved. The correctness and effectiveness of the proposed control law are verified by simulation results.

Keywords:

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