

电力系统

SVC与发电机励磁的逆推Terminal滑模协调控制

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摘要:

设计了一种静止无功补偿器(SVC)与发电机励磁的逆推Terminal滑模协调控制器。采用逆推法逐步构造李亚普洛夫函数, 不确定参数用自适应律替换, 最后一步加入Terminal滑模面, 使相关变量能够在有限时间内收敛到零。设计结果保证了控制系统的李亚普洛夫稳定性。整个设计过程没有任何线性化处理, 因而控制器充分利用了系统的非线性特性。针对单机无穷大系统的仿真结果表明, 所设计的逆推Terminal滑模协调稳定控制器能够快速阻尼功率振荡, 有效提高电力系统的暂态稳定性, 并维持机端电压的恒定。

关键词: 静止无功补偿器 Terminal滑模控制 逆推法

Backstepping Terminal Sliding Mode Coordinated Control for SVC and Generator Excitation

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Abstract:

A backstepping terminal sliding mode control coordinated control of SVC and generator excitation is designed. The Lyapunov functions are constructed by backstepping method. The uncertain parameters are replace by adaptive controller. In the last step, a terminal sliding mode is designed to drive the variable to converge in a finite period of time. According to Lyapunov theory, the stability of this control system is proved. The design procedure of controller is based on the nonlinear system without any linearization, so the nonlinear property of the dynamic system is well utilized. The simulation results of single machine infinite bus system show that the controller can damp power oscillation quickly, improve the stability of power systems, and maintain the terminal voltage.

Keywords: SVC terminal sliding mode control backstepping method

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