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论文

不确定电力系统模型的功角稳定控制器

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摘要：

针对网络结构不确定的电力系统，提出了一种数学模型及其控制方案，用于保障发电机的功角稳定。文中从发电机经典3阶模型出发，根据系统结构特点，引入能够反映互联网络线路不确定通断情况的权因子，提出了一种能够反映系统结构不确定特性的非线性不确定模型。经过适当坐标变换后，采用基于Lyapunov方程的鲁棒控制策略，设计了发电机功角鲁棒线性控制器。通过Matlab/Simulink对一个3机系统进行仿真表明，文中所提出的控制器在抑制电力系统网络结构扰动对功角稳定的影响方面是有效的。

关键词： 不确定电力系统模型 功角稳定 Lyapunov方程 鲁棒控制器

A New Kind of Power-Angle Controller for Uncertain Power System Model

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Abstract:

A mathematical model and corresponding control scheme for power system with structured uncertainty are proposed to ensure the power-angle stability of generators. By use of classical 3-order uniaxial model of generator and according to the feature of system structure, the weight factor that can reflect uncertainty of transmission line connection in interconnected power system is led in and a nonlinear uncertain model that can characterize the uncertainty of this power system is put forward. After appropriate coordinate transformation and by use of Lyapunov equation based robust control strategy, a robust linear controller for power-angle is designed. Simulation results of a 3-machine system built by Matlab/Simulink show that the proposed controller is effective in suppressing the affect of power network structure disturbance on power-angle stability.

Keywords: uncertain power system model power-angle stability Lyapunov equation robust controller

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