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电力系统

基于Sugeno模糊推理的静止无功补偿器多模态切换方法

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摘要：

多模态控制主要采用快速切换控制方式实现，此方法在切换瞬间易引起控制器输出和系统响应出现抖动现象。为平滑过渡过程，提出了一种基于Sugeno模糊推理的控制模态切换方法，将不同控制器的控制输出作为输入引入到Sugeno系统的输出隶属函数，并将输出隶属函数的概念扩展以实现模态的平滑过渡。通过仿真分析基于非线性度变换比例积分微分(proportional integral differential，PID)控制和常规PID控制2种方式在静止无功补偿器上的控制效果，验证了该方法可以平滑抖动现象，实现模态切换的平稳过渡。

关键词： 多模态切换　非线性比例－积分－微分　Sugeno模糊推理　静止无功补偿器

A Method of Multi-mode Switching for SVC Based on Sugeno Fuzzy Inference

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Abstract:

In view of their advantages of high control accuracy and strong robustness, the multi-model controllers, which combines various advanced control algorithms such as nonlinear proportional integral differential(PID), neural network, fuzzy logical control and genetic algorithm with conventional PID controller, are applied in the field of power system control. Multi-mode control is mainly implemented by fast switching control mode, however, it is easily to lead to the dithering in controller output and system response at the switching moment by this method. To smooth the transient process, a control model switching method based on Sugeno fuzzy inference is proposed. Taking the outputs of various controller as the input and leading them into the output membership function of Sugeno system and the concept of output membership function is expanded to implement the smooth transition among models. The actual control effects of nonlinear norm transformation PID (NNTPID) and conventional PID on static var compensator (SVC) are simulated, and simulation results show that the proposed method can smooth the dithering during the control process and the switching transient process can be smoothed.

Keywords: multi-mode switching　nonlinear proportional integral differential　Sugeno fuzzy inference　static var compensator (SVC)

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