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短文

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单神经自适应PSD 预测控制在过热汽温切换系统中的应用

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Application of superheated steam temperature switching systems based on single-neuron self-adaptive PSD predictive control

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摘要

图/表

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摘要

提出一种基于单神经自适应PSD (proportional sum differential) 预测控制器的新型火电厂过热汽温切换控制系统. 采用单神经自适应PSD 控制与Levinson 预测器相结合的控制方式以改善大滞后、多干扰系统的控制特性, 同时利用Foxboro 公司I/A 系列的DCS 控制系统平台对其组态设计(包括无扰切换、前馈补偿以及抗积分饱和等), 以实现手自动切换和各控制器之间的合理切换. 实验室的多次仿真研究和某火电厂的现场运行均表明该控制系统具有良好的控制品质.

关键词 : 单神经自适应PSD预测控制器, 过热汽温, 组态设计, 无扰切换, 前馈补偿

Abstract :

A switching control system of boiler's superheated steam temperature based on single-neuron self-adaptive proportional sum differential(PSD) predictive controller is proposed in this paper, in which a compound controller to improve the control characteristics of large-lag and multi-interferer systems is combined with single-neuron self-adaptive PSD controller and Levinson predictive controller. Configuration design including undisturbed switching, feed-forward compensation and anti-saturation of integrator is made with DCS control platform of Foxboro I/A series to realize manual/auto switch and switching between controllers. A large number of simulations in the lab and practical results in the power plant show the satisfactory control quality.

Key words : Single-neuron self-adaptive PSD predictive controller Superheated steam temperature Configuration design Undisturbed switching Feed-forward compensation

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