

继电保护、通信及自动化

用于电力故障波形重现的逆变器建模及其自适应控制

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摘要: 从频域角度对用于故障波形重现的逆变器进行建模和分析。通过引入导通时间偏移量和时间-电压转换系数的概念提出一种改进模型, 实现了占空比到输出电压的线性变换; 克服了近似模型由于线性化造成的频带受限。引用能消除固有跟踪误差的准PID控制器对改进模型进行控制, 为消除参数漂移等对其性能的影响, 提出了基于“有感知器监督的Hebb学习规则”的单神经元自适应准PID控制器, 很好地改善了控制性能, 满足了故障波形重现的精度要求; 且该算法运算量小, 适合于实时实现和现有软件的更新升级。

关键词: 单相桥式逆变器 建模仿真 准PID控制器 单神经元自适应控制 有感知器监督的Hebb学习规则

Modelling and Adaptive Control of Inverter for Electrical Fault Waveform Reconstruction

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Abstract: An inverter for the electrical fault waveform re- construction is modeled and analyzed in the frequency domain. By introducing the concepts of the biased on-time and time- voltage transfer coefficient, a modified model (MM) is proposed to realize the linear transition from the duration ratio to the output voltage and break the frequency limitation of the approximate models due to linearization. A quasi-PID controller that can eliminate the inherent tracking error is assigned to control the MM. To inhibit the parameters drifting impacts on the controller, a neuron adaptive quasi-PID controller based on the perceptron supervised Hebb learning rule is proposed, ameliorating the control performance excellently and making the strategy fulfill the accuracy requirements of fault waveform reconstruction; and the algorithm's computational burden is so low that it is suitable for real time implementation and software update.

Keywords: single phase full bridge inverter modeling and simulation quasi-PID controller single neuron adaptive control perceptron supervised Hebb learning rule

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