

自动化

电力互感器对同步相量测量的影响

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摘要:

电力互感器作为连接一次系统和同步相量测量单元(phasor measurement units, PMUs)的必要设备,是PMU能否准确获取一次系统信息的重要环节,其传变精度和动态特性直接影响PMU相量测量的精度。首先总结了电力系统动态现象所对应的动态信号模型,包括故障引起的非周期分量、幅值突变和系统振荡;分析了电力系统在发生以上动态过程时电力互感器对相量测量的影响;并侧重分析了电容式电压互感器的铁磁谐振和瞬变响应问题以及电流互感器的饱和问题,以此来观察电力互感器在不同动态情况下对相量测量结果的影响。

关键词: 同步相量测量单元 电容式电压互感器 瞬变响应 铁磁谐振 电流互感器

Impact of Instrument Transformers on Synchronous Phasor Measurement

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Abstract:

Intrumental voltage and current transformers are necessary devices to connect primary system with synchronous phasor measurement units (PMUs) and they are also the key links by which whether the PMU can accurately acquire information of primary system, and their transmission and tranformation precision as well as their dynamic characteristics directly impact the phasor measurement accuracy of PMU. The authors firstly summarize the dynamic signal models corresponding to dynamic processes in power system, including aperiodic components, abrupt change of amplitude and system oscillations caused by faults; then analyze the impacts of intrument transformers on phasor measurement during above-mentioned dyanmic processes occurred in power system; special emphasis are laid on the analysis of ferromagnetic resonance and transient response of capacitor voltage transformer as well as saturation of instrumental current transformer to research the impacts of intrument transformers on phasor measurement results under various dynamic processes. Based on the analysis results, some suggestions are proposed to provide reference for drafting evaluation criteria of dynamic behavior of PMU and to provide bases for rationally choosing instrument transformers used in wide area measurement system.

Keywords: phasor measurement unit (PMU) capacitor voltage transformer transient response ferro-resonance current transformer

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