

自动化

带快速接地开关的线路单相自动重合闸判别原理

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摘要:

随着我国电网联系的增强,为降低设备成本,可以不使用电抗器限制工频过电压,在超、特高压输电线路中用快速接地开关(high speed grounding switches, HSGS)来快速熄灭电弧将是一种很好的办法。分析了单相接地瞬时性故障和永久性故障时流过HSGS的电流信号的不同特点。利用Prony法每隔1个工频周期快速拟合该电流信号,提取出工频量的幅值,分析所得到的一系列幅值信息发现,瞬时性故障时工频量的幅值必然从一个稳定值跳跃到另一新值并在新值保持稳定,而永久性故障则不然,据此可判别故障的性质。Prony法对于非平稳信号具有良好的拟合效果,能够实现频率的自适应分解,且克服了傅里叶算法不能处理非平稳信号的缺点,对于信号的变化反应敏感。Matlab/Simulink仿真结果表明了该方法的有效性和准确性。

关键词:

Fault Identification for Single-Phase Auto-Reclosure of Transmission Lines With High Speed Grounding Switches

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Abstract:

Along with the enhancement of power grid connection in China, it is possible for EHV/UHV transmission lines not to suppress power frequency over-voltage by reactors but by high speed grounding switches (HSGS) for fast arc extinction. In this paper the different features of current signals passing through HSGS due to instantaneous single-phase earth fault and permanent fault respectively are analyzed. Using Prony method, the current signals passing through HSGS are fast fitted every other power frequency period and the amplitudes of power frequency quantities can be extracted; then by means of analyzing the obtained series of amplitude information, it is discovered that for instantaneous fault the amplitude of power frequency quantity jumps from one stable value to another new value and the new value keeps stable, and yet for permanent fault the amplitude of power frequency quantity does not so behave, from this the nature of fault can be judged. The Prony method possesses good fitting result for non-stationary signals and can implement the adaptive decomposition of frequencies, in addition, it is sensitive to the variation of signals, so the defect of Fourier algorithm that the non-stationary signals cannot be processed is remedied. Simulation results by Matlab/Simulink show that the proposed method is effective and correct.

Keywords:

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