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电工理论与新技术

比较式光学电流互感器的分析设计与试验研究

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摘要： 缺乏长期稳定性是光学电流互感器走向实用化、实现大面积推广的主要阻碍，针对这一问题，提出一种新补偿方案--比较式光学电流互感器。它将光学测量法与比较测量法相结合，巧妙地实现了对线性双折射和Verdet常数这两个稳定性影响因子的同时补偿。设计了双输入双输出的解调方法及相应的传感头结构和信号处理单元。这种解调方法可以更好地克服光路及电路的不一致对测量结果的影响，提升互感器的整体性能。试验结果表明：比较式光学电流互感器的线性度可达到IEC 0.2级要求；在光学电流互感器适用的220 kV以上电压等级应用场合，比较式光学电流互感器具有较好的抗干扰性能；在50 ℃温度变化范围内，普通光学电流互感器的误差变化量高达16%，而比较式光学电流互感器的误差变化仅有1%，证实了基于比较法的补偿方案的有效性。

关键词： 比较式光学电流互感器 双输入双输出解调 线性双折射 Vetdet常数

Design and Test Research of COCT Based on Theory Analysis

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Abstract: The lack of long-term stability baffled the popularity of OCT (optical current transformer) in power system application. A novel compensation method called comparative OCT (COCT) was proposed here. It compensated masterly both linear birefringence and Verdet constant, which affected the stability of OCT mainly, by combing optical measurement and comparing measurement. A new dual-input and dual-output demodulating scheme which could reduce the damage to OCT accuracy caused by the drift of light intensity or circuit gain was designed. The OCS (optical current sensor) structure and signal processing unit were respectively designed. Test results show the linearity of COCT is better than IEC 0.2 class limit, and is suitable to the applications, in which the voltages are higher than 220 kV, the COCT accuracy is almost not affected by the existence of neighbor phases. The temperature test result tells in the temperature range of 50 ℃ the error of COCT is less than 1%, much better than an uncompensated one 16%. And thus the effectiveness of COCT is verified.

Keywords: comparative optical current transducer dual-input and dual-output demodulating linear birefringence Verdet constant

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