

电力系统

## 高压直流输电系统保护装置冗余配置的可靠性分析

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摘要

根据高压直流输电保护系统的可靠性要求, 基于不可修复系统串并联结构的可靠性分析原理, 建立了几种典型冗余配置方式的可靠性模型, 比较了各种冗余方式的可靠性。主要分析了工程上常用的三取二和完全双重化保护配置方式, 综合考虑可靠性和经济性等因素, 得出结论: 三取二配置是直流输电系统保护冗余方式的较好选择。文章同时建议采用3套测量回路和输出回路, 以便与三取二冗余方式相配合, 提高整体的可靠性。

关键词 [直流输电保护; 冗余; 可靠性; 完全双重化](#)

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### Reliability Analysis on Redundant Configuration of Protective Relays for HVDC Power Transmission System

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Abstract

In the light of the requirement to reliability of protective relays for HVDC power transmission system, the reliability models for several typical redundant configuration schemes are built based on the principle of reliability analysis for unrepairable systems with the structure of series-parallel connection, and the reliability of various redundant modes are compared. Two protection configuration modes that are often applied in engineering, namely the "two out of three" mode and full duplication mode, are mainly analyzed, and by means of comprehensive comparison in reliability and economy following conclusion is obtained that the "two out of three" configuration mode is a better choice for protective redundancy of HVDC power transmission system. Meanwhile, it is suggested to use three sets of measuring circuits and output circuits to match up with "three out of two" redundant configuration of protective relays to enhance global reliability of protection for HVDC power transmission system.

Key words [protection for HVDC power transmission; redundancy; reliability; full duplication](#)

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