

Intelligent use of hybrid energy systems for relay protection



Overview

In this research paper, an adaptive and intelligent protection scheme is developed that brings selectivity and sensitivity to the conventional overcurrent relays considering the changes in grid topologies, changes in grid operation modes, and changes in short-circuit behavior. In this research paper, an adaptive and intelligent protection scheme is developed that brings selectivity and sensitivity to the conventional overcurrent relays considering the changes in grid topologies, changes in grid operation modes, and changes in short-circuit behavior. Voltage source converters (VSC)-HVDC can realize the independent control of active and reactive power, transmit power to the passive network, and connect the electric energy generated by small and scattered renewable energy sources more economically. The smart grid system increases the flexibility and complexity of the power system, making fault detection and isolation the. The new generation of intelligent substations has achieved online monitoring functions for secondary equipment, making some state variables of relay protection equipment become observable indicators. Based on this, this paper proposes a novel relay protection equipment status evaluation strategy.



Article Content

Hybrid Protection Scheme Based Optimal Overcurrent

A directional overcurrent relay is commonly used to protect the power distribution networks of a distributed system. The selection of the appropriate

Review on Applications of Artificial Intelligence in Relay Protection ...

It can make outstanding performance in modern power system relay protection with abundant information, chaotic fault features and high performance requirements. It can be used for

Artificial intelligence algorithms enhancing relay protection and ...

In this research project, Artificial Intelligence (AI) algorithms applied to the relay protection of high and low-voltage distribution networks are investigated.

Distributed relay protection for distribution network based on hybrid ...

2. Hybrid relay protection method This paper puts forward the power method in transmission line protection and the current method in bus protection to achieve full coverage of

Novel method for setting up the relay protection of power systems ...

Within the framework of the approach to setting up the relay protection described later in this article, the EPS simulator developed at the Tomsk Polytechnic University was used – Hybrid

The Impact of New Energy Integration on Traditional Relay Protection ...

As new energy has impacts on the traditional relay protection system, through applying a series of countermeasures, the fault detection and protection action speed was waned, and the stability of the

Novel intelligent multi-agents system for hybrid adaptive protection of ...

In this paper, a hybrid scheme of adaptive and multi-agent protection for micro-grid is discussed, which will be able to provide safety protection at several layers and levels, using the

New Development in Relay Protection for Smart Grid

This series of papers report on relay protection strategies that satisfy the demands of a strong smart grid. These strategies include ultra-high-speed transient-based fault discrimination, new co

A review on adaptive power system protection schemes for future

This review paper is helpful for researchers, engineers, and policymakers involved in the development and implementation of adaptive protection schemes, enabling them to make informed

Intelligent protection systems for grid-connected renewables: A review ...

This review critically examines the role of AI in enhancing grid protection, focusing on fault detection, isolation, classification, adaptive relay coordination, islanding detection, and the mitigation

(PDF) Intelligent protection relay system for Smart Grid

Abstract and Figures The authors suggest the concepts of protection relay systems for operation within a Smart Grid and describe the results of a

Novel method for setting up the relay protection of power systems ...

Nowadays, the development of the electric power system is associated with the penetration of power generation units based on renewable energy sources and operated with energy

Societal and technology trend report

The crisis of traditional relay protection: A disruption of the technological paradigm Using the high short-circuit currents and system inertia provided by synchronous generators, traditional relay protection

New development in relay protection for smart grid

Relay protection is the key to the safe operation of a power system. The functions of relay protection have been developed along with enhancements to electrical power systems and the implementation

Adaptive Hybrid Overcurrent Protection Scheme with

In this research paper, an adaptive and intelligent protection scheme is developed that brings selectivity and sensitivity to the conventional overcurrent

Adaptive electronic relay for smart grid based on self

This paper presents an optimal protection solution using an adaptive electronic relay to enhance reliability and enable self-healing. The proposed

Applications of Protection Relays in the 21st Century in Smart Grid

1. INTRODUCTION Concept of Smart Grid is primarily an approach and implementation of state of the art technological advancement into Electrical power system. In the same vein, advancement in

Adaptive Dual Setting Optimal Protection Coordination for Hybrid

This work proposes an adaptive dual-setting scheme for the optimal protection coordination of hybrid AC/DC microgrids (HMG), utilising a novel hybrid relay characteristic. The

Machine Learning-Driven Three-Phase Current Relay

This study focuses on improving the effectiveness of three-phase current relay protection systems, which is a significant problem. It is achieved through the use

Integration and Coordination Strategy of Relay Protection System in ...

In the smart grid, a distributed intelligent control system is introduced to improve the response speed and reliability of the centralized relay protection system.

The value and development of relay protection technology in modern ...

With the large-scale integration of renewable energy into modern power systems, relay protection technologies are encountering both challenges and opportunities. This paper reviews key research

Challenges in Renewable Energy Protection | Delgado Relay Protection ...

Renewable energy generation, such as wind, solar, and hydropower, plays a crucial role in the transition towards a more sustainable and low-carbon future. However, integrating these

Review on Applications of Artificial Intelligence in Relay Protection

The proposed ICT-based protection scheme for the overcurrent relay is a technically feasible protection solution in MV networks, which ensures the

Frontiers | Strategy for evaluating the status of relay

Based on the operation specifications of relay protection devices and practical operation and maintenance experience, the evaluation level boundary

Research on Relay Protection Technology Based on Smart Grid

Relay protection, as the first line of defense to ensure the safe operation of the power grid, needs to actively adapt to the power grid reform. The thesis first introduces the related technologies of relay

Adaptive electronic relay for smart grid based on self-healing ...

The third section introduces an adaptive electronic relay for the smart protection system, detailing the control model designed to achieve the self-healing aims of the smart grid system. The fourth section

Fault diagnosis of intelligent substation relay protection system based ...

In the context of global energy transformation, the construction of smart grids is becoming a novel vogue in the evolution of power systems. As the core node of the smart grid, the

Analysis of the Impact of Relay Protection in AC/DC Hybrid Power

Based on simulation data, the interaction effects of AC/DC relay protection under various DC output modes were studied. Through simulation data, the AC electric properties of AC/DC hybrid power

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