Impact of Oscillations on Relay Protection

Overview

In this paper, electrome-chanical wave oscillation propagation is modeled, and its impact on different power system protective relays, such as overcurrent, distance, and out-of-step relays is studied. They can cause adverse effect on power system protective relays. Most microprocessor relays track system frequency to calculate the. Abstract—With increased integration of renewable energy resources, FACTs devices and series compensation, sub-synchronous oscillations (SSO) have become more common in electrical power systems in recent years. However, non-fault voltage and current disturbances may lead to the inadvertent detection of a fault in the same way as voltage disturbances may lead to the tripping of end-user equipment. Many protection functions may respond during such events, but not always in an intended, expected, or coordinated manner. This paper aims to present an overview of the scenarios which give rise to. io, Canada, which impacted mil-lions of customers. On September 28, 2003, the Italian network was separated from the rest of Europe, and the whole country of Italy fell into darkness.

Article Content

Jul 21, 2025

Effect of waveform distortion on protective relays

The influence of harmonics on protective relays is described theoretically, and the results of laboratory tests are given. Representative relays using various operating principles were tested using

May 06, 2026

Protective Relays Performance in a Harmonic Environment

Modern day power systems create harmonics within the electrical network that can have an impact upon the associated protective system.

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(PDF) Evaluation of Harmonics Impact on Digital Relays

PDF | This paper presents the concept of the impact of harmonic distortion on a digital protection relay. The aim is to verify and determine the

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“A Review of Literature on Effects of A REVIEW OF ...

The protective relay is a vital part of protection system and its reliable operation is immensely desired. This paper aims at presenting a comprehensive survey on the cr

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Performance of protection relays during stable and unstable power ...

This work will characterise and evaluate the impact of stable and unstable power swings on a wide range of protection functions in protection relays.

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Impact Analysis of High-Altitude Electromagnetic Pulse

Protection relays are important equipment used for protection, control, and metering functions in the power grid. These relays are used to protect critical

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Relay Performance During Major System Disturbances

The aim of this paper is to explain which relay systems are most prone to operate during stressed system conditions, and why relay systems operate, to share experiences and lessons

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Protection Against Sub-Synchronous Oscillations, A

This paper presents design and implementation of a SSO relay model that can effectively extract sub-synchronous components in system

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Power Quality Disturbances and Protective Relays

The aim of the research presented in this thesis is to quantify non-fault voltage and current disturbances at the terminals of protective relays; in other words: to define power quality from the viewpoint of a

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Performance of protection relays during stable and

This work will characterise and evaluate the impact of stable and unstable power swings on a wide range of protection functions in protection relays.

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Effects of Low Frequency Oscillations on Distance Relay in Series ...

This paper has addressed the effects of low frequency oscillations on the calculated effective impedance of the ground or phase elements in the protective dista

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Power Swings in Power System Protection | Fault

Power Swings in Power System Protection are surges of power due to the oscillation of generators with respect to each other which may occur because of changes in

Aug 07, 2025

Impact of electromechanical wave oscillations propagation on protection ...

To have a better insight in the effect of electromechanical wave propagation on protective device, a simulation testbed evaluation of relay operation under electrome-chanical oscillations of

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Performance of Protection Relays During Stable and Unstable Power

This basic relationship between the period and magnitude of the oscillation in voltage magnitude is critical to understanding how power swings impact protection relay functions.

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Behavior of protective relays during Sub Synchronous Resonance

It is obviously clear that protective relays are affected in such conditions. In this paper, Manitoba Hydro electrical network is examined with series capacitors by PSCAD/EMTDC to investigate impact of

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Harmonics Impact on Protective Relays

Protective relays are critical for power system protection but their performance can be degraded by harmonics. The paper surveys how harmonics impact different

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Impact of electromechanical wave oscillations propagation on

In this paper, the required testbed development to evaluate the effects of propagation of electromechanical wave oscillations through protective devices including overcurrent, distance and

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Impact of Sub Synchronous Resonance on operation of protective relays ...

Impact of SSR on operation of different kinds of protective relays and representing adaptive algorithms to prevent mal-operation of the relays is presented in literature . ...

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Relay Element Performance During Power System Frequency

Relays use voltage and current phasors to construct different protection elements such as overcurrent, current dif-ferential, and distance elements. Different filters help relays reduce the impact of noises

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Impact of electromechanical wave oscillations propagation on

In this paper, electromechanical wave oscillation propagation is modeled, and its impact on different power system protective relays, such as overcurrent, distance, and out-of-step relays is

Jan 02, 2026

Power System Protective Relays: Principles & Practices

Protective relays and devices have been developed over 100 years ago to provide “lastline”of defense for the electrical systems. They are intended to quickly identify a fault and isolate it so the balance of

Sep 28, 2025

SSO Relay Model for Power System Protection

This paper presents a relay model designed to detect and protect against sub-synchronous oscillations (SSO) in electrical power systems, which can cause significant equipment damage and instability.

Oct 07, 2025

Protection Against Sub-Synchronous Oscillations, A Relay Model

Specially designed relaying devices are often employed to detect and isolate harmful SSO conditions as when unconstrained, they can lead to widespread equipment damage and system instability.

Jul 30, 2025

A Review of Literature on Effects of Harmonics on Protective Relays

Integration of distributed generations (DGs) and rapid growth of power electronics based loads in the electric power system is infusing harmonics with current and voltage signals. Harmonics are

Apr 24, 2026

The Role of Protection Relays in Power Systems and an

Protective relays are critical in power systems because they serve as decision-making devices that ensure the safe operation of power grid. They play a key role in power system protection.

Jun 11, 2026

The Impact of Sine-Wave Distortions on Protective Relays

Sine wave distortions on power systems are shown to affect the performance of both electromechanical protective relays of classical designs and static relays of various designs. Digital based (computer)

Dec 06, 2025

Relay Element Performance During Power System Frequency

Different protection elements behave differently for the same frequency excursion. Different relay designs also sig-nificantly impact the behavior of protection elements. Protec-tion engineers must

Contact Us

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