

Are commutation failures a threat to high-voltage direct current inverters?

With the increasing applications of high-voltage direct current inverters in heavy-load grids, commutation failures (CFs) pose a severe threat to the safe and stable operation of power systems. This study first sorts methods of CF inhibition into different categories and then investigates their effectiveness, adaptability and limitations.

Do inverter commutation failures cause transient voltage fluctuations?

Inverter commutation failures (CFs) in LCC-HVDC systems can cause severe sending-end voltage fluctuations. However, owing to the reliance of analysis methods on average-concept-based power quantities, the transient behavior of the sending-end voltage during inverter CFs remains elusive, hindering the advancement of its suppression strategy.

What is commutation failure in LCC-HVDC?

Introduction Line-commutated converter-based high voltage direct current (LCC-HVDC) technology has been widely used because of advantages such as lower transmission losses and bulk power transmission . However, commutation failure is one of the most common inverter failures in the LCC-HVDC systems.

Can a commutation failure cause severe sending end voltage fluctuations?

Simulation results demonstrate the correct analysis and effective suppression method. Inverter commutation failures (CFs) in LCC-HVDC systems can cause severe sending-end voltage fluctuations.

What is line-commutated converter-based high-voltage direct current (LCC-HVDC)?

1. Introduction With the advantages of low power loss, large transmission capacity and flexible power regulation, line-commutated converter-based high-voltage direct current (LCC-HVDC) transmission systems have been widely used in cross-regional power transmission and renewable energy integration [, ,].

What are capacitor commutated converters?

Capacitor-commutated converters can make the commutation progress easier and faster with the help of capacitors in block A. However, the capacitors result in additional reactive power consumption, harmonics and overvoltage issues that should be eliminated by additional filters and lightning arresters .

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Feb 7, 2019 · Failure of the commutation process is a serious malfunction in

line-commutated high-voltage direct current (HVdc) converters, which mainly occurs due to inverter ac faults ...

Mar 21, 2025 · ABSTRACT Three Phases AC fault to ground is a symmetrical fault which creates a high currents and instability in the power system. In the HVDC link system, this kind of faults ...

Oct 16, 2022 · Faced with the problems of highly inverse source-load distributions and large-scale renewable energy consumption, China is vigorously developing high-voltage, large-capacity, ...

Sep 22, 2016 · This paper presents two new pulse-width modulation (PWM) methods for a high frequency ac-link (HF-link) inverter commutation which uses a form of four-step switching ...

Jan 1, 2023 · Line-commutated converter-based high voltage direct current (LCC-HVDC) technology has been widely used because of advantages such as lower transmission losses ...

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Dec 3, 2024 · This paper primarily discusses the hybrid application technology of high-voltage SiC MOSFETs and IGBTs in high-power three-level, three-phase inverters. It thoroughly utilizes ...

Jul 25, 2023 · In this commutation method, current can flow in the inverter in 1 of 2 ways: out of 1 high-side switch and into 2 low-side switches (sequences 100, 010, and 001), or out of 2 high ...

Sep 16, 2022 · Fig 3: A hybrid solar inverter Under this tier, there are two inverter types. Current Source Inverter The CSI's input is a current ...

Feb 25, 2024 · Commutation failures in high-voltage direct current (HVDC) transmission systems often occur within inverter stations, posing challenges to the safe and consistent operation of ...

Apr 16, 2022 · Abstract. Commutation failure is one of the most common faults in the operation of high voltage direct current transmission (HVDC). This paper analyzes the influence of voltage ...

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