

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.

When does a YD inverter fail to commute?

When the commutation first occurs in the YY inverter, it's assumed that the commutation failure first occurs in the commutation of V12 to V32. Since the short-circuit path is formed when V42 is conducted, the YD inverter will fail to commute during the commutation of V21 to V41. The commutation process is shown as Fig. 7 (a).

What happens if an inverter fails two consecutive commutation times?

If the inverter fails two consecutive commutation times or more, it is called continuous commutation failure, and vice versa is called one commutation failure. The problem of commutation failure discussed in this article is a commutation failure. The converter valve is composed of semi-control device thyristors.

What is the commutation area of an inverter?

In normal operation, the inverter side has a $+m + g = p$, and the commutation area is S_1 . In the event of a fault, the voltage amplitude of the commutation bus is reduced, and the commutation area is S_1' . When $S_1 = S_1'$ and the firing angle remains the same, the commutation time will be extended.

What happens if a DC converter fails commutation?

When a fault causes a commutation failure in the DC system, the short circuit of the upper and lower arms of the inverter will cause a sudden increase in DC current. By detecting the change law of the DC current I_d at the outlet of the rectifier, it can be diagnosed whether the converter has failed commutation.

What causes commutation failure?

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 amplitude reduction, zero-crossing displacement, and voltage waveform distortion on the commutation...

High-frequency pulsed AC link inverters [1] [2] have the characteristics of bidirectional power flow, two-stage power conversion (DC/HFAC/LFAC), high conversion efficiency and reliability, but ...

converter for all load conditionsn Minimization of common-mode voltage switching due to commut ti
Keywords: Common-mode voltage, High-frequency transformer, leakage commutation, PWM ...

High-voltage inverter commutation

Offshore wind power transmission systems require high capacity, and LCC-based HVDC transmission systems are well-suited to meet this demand. Nevertheless, LCCs are ...

Most commutation failures in high-voltage direct current (HVDC) systems are caused by AC faults on the inverter side. Conventional control methods for commutation failure ...

Commutation failure (CF) is the main fault type in high voltage direct current (HVDC) systems with line commutated converters. To mitigate CFs, considerable researches have ...

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 ...

This document discusses commutation circuits for thyristors and power electronics. It covers the operation of turn-off circuits, design of SCR ...

The site is home to a center for the research and development of high-voltage electric technologies, especially for the inverters for (plug-in) hybrid and fully electric vehicles.

This paper presents a single-stage bidirectional high-frequency transformer (HFT) link dc/ac converter topology for a three-phase adjustable magnitude and frequency PWM ac ...

This paper analyzes the phenomenon and principle of commutation failure in HVDC transmission system, and analyzes the influence of voltage amplitude reduction, zero ...

Through fault validation simulations conducted across three HVDC transmission systems, our strategy demonstrates effective suppression of commutation failure incidents ...

This thesis proposes two implementations of transformer isolated high frequency link inverters that overcome the problem of leakage energy commutation. The inverters consist of a H-Bridge to ...

While the output voltage of a two-level PWM inverter takes either the zero or High level, three-level and multilevel PWM inverters provide the output voltage at multiple levels by ...

The hybrid cascaded LCC-MMC HVDC system can maintain power transmission capacity by serially connecting the line-commutated converter and modular multi-level ...

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Abstract: 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 ...

This paper presents a single power-conversion dual-active-bridge (DAB) microinverter with safe commutation and high efficiency for PV power applications. In DAB ...

Abstract: Failure of the commutation process is a serious malfunction in line-commutated high-voltage direct current (HVdc) converters, which mainly occurs due to inverter ...

Abstract--This paper presents an investigation of the effect of the commutation (overlap) period on the value of the output current and on the stability of a Current Source Inverter (CSI). The ...

With the increasing applications of high-voltage direct current inverters in heavy-load grids, commutation failures (CFs) pose a severe threat ...

This document discusses commutation circuits for thyristors and power electronics. It covers the operation of turn-off circuits, design of SCR commutation circuits, forced commutation ...

Given this, this paper proposes a power-free quantitative analysis method and a targeted suppression strategy for sending-end voltage fluctuations.

Commutation failure (CF) is one of the most prevalent events in line-commutated converter-based high-voltage direct current (LCC-HVDC) ...

The LCC HVDC transmission system offers significant advantages of long-distance transmission, large transmission capacity, and economic efficiency. However, it relies on the connected AC ...

In the multi-infeed HVDC system, the interaction between inverter stations is an important factor that triggers the propagation of commutation failure. This paper aims to study ...

This paper presents the essential reason for subsequent commutation failures (SCFs) in high voltage direct current (HVDC) systems, and accordingly proposes a novel ...

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

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