Fault Detection in DC Microgrids

Do DC microgrids require advanced protection techniques for fault detection and isolation?
Abstract: DC microgrids require advanced protection techniques for fault detection and isolation(FDI). In this work,an FDI method able to respond to different types of component faults is developed based on system modeling. First,the state-space representation of a multiterminal dc microgrid with component faults is derived.

How to detect faults in DC microgrids?
In ,cable current derivativesare utilized to detect faults in DC microgrids. Alternatively,traveling wave (TW) protection schemes have been introduced to accommodate a faster tripping protection in electric power grids. These schemes rely on high-frequency measurements.

Can Gaussian process detect faults in a simple dc microgrid?
In ,Gaussian Process (GP) is used to detect faultsin a simple DC system. In this paper,a TW protection scheme utilizing machine learning (ML) for DC microgrids is proposed. The proposed scheme utilizes discrete wavelet transform (DWT) to calculate the high-frequency components of DC fault currents.

How effective is FDI method for detecting faults in DC microgrids?
The performance of the proposed FDI method is verified under the real-time (RT) simulation of a three-terminal low-voltage dc microgrid and with a small-scale laboratory dc grid. The proposed FDI method is proved to be effectiveto detect and isolate different faults in dc microgrids with a response time of 1 ms.

Why is data-driven fault detection a major constraint for DC microgrids?
Good robustness against measurement noises and changes in system configurations. The lack of fault datais the major constraint on data-driven fault detection and isolation schemes for DC microgrids.

Why is a dc microgrid important?
No zero crossing of current in DC systems makes the interruption of fault currents with fuses and circuit breakers more difficult which in turn creates arcing and long fault clearing time . On the other hand,fast detection and isolation of faultsin a DC microgrid is of particular importance ,,.

The most common faults in DC microgrids are pole-to-pole (PP), pole-to-ground (PG), and two PG (2PG) faults. Pole-to-pole faults appear to a smaller extent, but can cause extremely high currents and damage to the ...

Reliable and accurate fault detection plays a crucial role in the microgrid operation by enabling an increased operational flexibility. Successful classification of events in complex microgrid ...

Fault detection in a Direct Current (DC) microgrid with multiple interconnections of distributed generation

units (DGUs) is an interesting topic of research. The occurrence of ...

In this article, a fault detection and isolation technique for series arc faults in dc microgrids with multiple power electronics loads is proposed using unknown input observers ...

The proposed protection algorithm detects and locates DC faults with high resistances, utilizing fault detection and location, employing the high-order synchrosqueezing transform that determines magn... Abstract ...

The paper proposes a fast fault detection method for radial DC microgrids established on mathematical morphology (MM) denoising filters and detection principles utilizing only local measurements.

Importance of fast detection of faults in a DC microgrid to increase the lifetime of power electronics switches and enhance the controllability over converters. ... [17], cable ...

This paper introduces a DC-link fault detection and synchronization control strategy for grid-forming inverters in hybrid DC/AC microgrids, aiming to bolster system stability and reliability. ...

The proposed protection algorithm detects and locates DC faults with high resistances, utilizing fault detection and location, employing the high-order synchrosqueezing ...

The safety of DC microgrids is threatened by multiple types of faults occurring in different components, entailing multi-target fault detection and isolation solutions. To address this ...

DC microgrids require advanced protection techniques for fault detection and isolation (FDI). In this work, an FDI method able to respond to different types of component faults is developed ...

The series DC arc fault can happen at arbitrary locations of any DC systems with a high voltage DC bus [16], [17], [18].Hence, a comprehensive investigation of DC arc fault in ...