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Simulation of Two Terminal Fault Combination Location Method in MMC-HVDC Transmission Line Model

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Abstract: *Due to the widespread use of renewable energy, multi-terminal flexible HVDC grids are required. However, the issue of security remains a significant obstacle. This is primarily because DC networks have a lower inductance than AC networks, which typically causes a sudden drop in DC voltage and a rapid rise in fault current that can reach dangerous levels in milliseconds. Distance protection and other steady state-based high voltage AC (HVAC) system protection algorithms are not suitable for MT-HVDC system protection. In the event of a fault, unit line protection devices must operate at a sufficient speed and isolate only the faulty section to prevent a short circuit from causing the entire system to fail. They are susceptible to direct and alternating current faults. Fast and selective protection schemes are required to guarantee their high reliability and continuous operation. Using modular multilevel converters, this project aims to investigate the transient voltages brought on by dc line faults in an HVDC grid. Utilizing MATLAB to model an MMC-based four terminal HVDC grid, extensive simulations are carried out to verify the scheme's efficacy.*

Keywords: DC line protection; Multi-terminal HVDC grid; Fault classification; Faulty pole selection; Fault transient voltage

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