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Analysis of an High Voltage Direct Current (HVDC) Connection Using a Real-Time Simulator Under Various Disturbances

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Abstract : A thorough and accurate simulation is necessary for the study of a High Voltage Direct Current (HVDC) link system during various types of disturbances, including internal faults on both converters, either on the rectifier or on the inverter, as well as external faults, such as AC or DC faults on both converter sides inside the DC link party. In this study, we examine how an HVDC inverter responds to three different types of failures, including faults at the inverter valve, system control faults, and single-phase-to-ground AC faults at the sending end of the inverter side. As this phenomenon represents the most frequent problem that may affect inverter valves, particularly those based on thyristor valves (LCC (line-Commutated converter)), it is more precise to explore which circumstance generates and raises the commutation failure on inverter valves. Because of the techniques used to accelerate the simulation, digital real-time simulators are now the most potent tools that provide simulation results. The real-time-lab RT-LAB platform HYPERSIM OP-5600 is used to implement the Simulation in the Loop (SIL) technique, which is used to validate the results. It is demonstrated how to recover from both the internal faults and the AC problem. The simulation findings show how crucial a role the control system plays in fault recovery.

Keywords : hypersim simulator, HVDC systems, mono-polar link, AC faults, misfiring faults
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