Fault Ride Through Enhancement of VSC-HVDC Connected Offshore Wind Power Plants

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Voltage source converter-high voltage direct current (VSC-HVDC) connections have become a new trend for long-distance offshore wind power transmission. In order to facilitate the derivation of the feedforward DC voltage control based fault ride through (FRT) technique, this chapter describes the model of a VSC-HVDC-connected offshore wind power plant (WPP) with an external grid. It proposes a feedforward DC voltage control based FRT technique to control the AC voltage at the WPP collector network during grid-side faults. Time-domain simulations have been used to verify the efficacy of the proposed feedforward DC voltage control based FRT technique for VSC-HVDC-connected WPPs. Time-domain simulation results shows that the proposed FRT scheme can successfully enable VSC-HVDC-connected WPPs to ride through balanced and unbalanced faults in host power systems, as well as faults in the WPP collector system, with a fast and robust response.

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