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CAPACITOR COMMUTATED CONVERTER HVDC TRANSMISSION WITH WEAK AC NETWORKS

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Abstract

Most of the recent HVDC systems are of Line Commutated Converter (LCC) High Voltage Direct Current (HVDC) Systems. This conventional design is well-known and proven technology during last decades. However, the operation of HVDC systems using line-commutated converter operating with weak AC networks becomes unreliable due to frequent commutation failures and is less robust to disturbance in the AC networks. The problems associated with conventional design can be eliminated with Capacitor Commutated Converter (CCC) HVDC technology. In the present work, the increased interest towards this CCC HVDC technology has been put forward by conducting extensive studies under steady state as well as dynamic operating conditions. This paper presents analytical steady state study as well as dynamic behavior of Capacitor Commutated Converter (CCC) and its performance is analyzed by comparing with that of Line Commutated Converter (LCC) High Voltage Direct Current (HVDC) system when connected to a very weak AC network. The analysis is based on fundamental frequency quantities. The results from the analytical study are validated with PSCAD/EMTDC simulation software. A CIGRE Benchmark model HVDC System data (1000MW/±500KV) is referred.

Keywords : Capacitor Commutated Converter, Line Commutated Converter, weak AC network, Short Circuit Ratio