

SIMULATION OF VOLTAGE SOURCE CONVERTER-BASED HVDC TRANSMISSION SYSTEM, WITH 200MVA (+/-100KV), USING SPWM TECHNIQUE

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ABSTRACT

A 200 MVA (+/- 100 kV DC) forced-commutated Voltage-Sourced Converter (VSC) interconnection is used to transmit power from a 230 kV, 2000 MVA, 50 Hz system to another identical AC system. The rectifier and the inverter are three-level Neutral Point Clamped (NPC) VSC converters using close IGBT/Diodes. The Sinusoidal Pulse Width Modulation (SPWM) switching uses a single-phase triangular carrier wave with a frequency of 27 times fundamental frequency (1350 Hz).. The 40 Mvar shunt AC filters are 27th and 54th high-pass tuned around the two dominating harmonics. The discrete control system generates the three sinusoidal modulating signals that are the reference value of the bridge phase voltages. The amplitude and phase of the modulating signals can be calculated to the reactive and real AC power flow at the PCC, or the reactive power flow at the PCC and the pole to pole DC voltage. It would also be possible to control the AC voltage amplitude at the PCC.

KEYWORDS: HVDC, Voltage Source Converter (VSC), IGBT, SPWM, Control Design