Influence of current limitation on voltage stability with voltage sourced converter HVDC

A first study of voltage stability with relevant amount of Voltage Sourced Converter based High Voltage Direct Current (VSC-HVDC) transmission is presented, with particular focus on the converters’ behaviour when reaching their rated current. The detrimental effect of entering the current limitation on the Power-Voltage (PV) curves at a load bus is exemplified on a three-bus system, proposing a method to model the converters in current limiting mode through ideal current sources. The influence of the current magnitude and angle on the reduced stability margin is analysed and results show that, when the current limit is reached, despite the detrimental effect brought about by an increased equivalent transmission impedance, the loss of stability margin can be minimised by proper control of the converter.

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