Paris Session 2022

Inverter modelling – Protection studies

SC B5 Protection and Automation

PS1.4 – Modelling of inverters for protection coordination studies

Q1.03 Are phasor-domain inverter models sufficient for most protection coordination studies and what are the key criteria for deciding when EMT simulations are preferred for evaluating protection performance over conventional phasor-domain short circuit analysis?

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Conclusions made by Svenska kraftnät i.e. answer to PS1.4 Q1.03

Yes, probably for most protection coordination studies in a system with low or moderate degree of fault current from IBRs. However, a sanity check in an EMT environment of protection performance/conditions at the IBR end could be needed.

If (new) state of the art protections are installed at the IBR end, as is common when a new site is established, it is probably not needed. If there are older types of protections, e.g. with measurement loop switching, in the vicinity more care have to be taken. HIL-simulation could then be a good approach for identification of the potential problems.

The answer to the very much desired key criteria for when EMT simulations are preferred or required is that we unfortunately not know and the answer to the question is hence pass. Having said this it must be added that the degree of IBR fault current is probably a significant factor for if phasor-domain simulation is sufficient or if EMT simulation is needed.