

Master Project/Thesis

Bachelor Thesis

Modeling power converters using power factory for harmonic stability analysis

Overview The increase of power electronics penetration causes harmonic currents injection into the low voltage distribution grid, this has implications on power quality which might lead to harmonic instability. The aim of the project is to investigate the accuracy of Power Factory Dynamic Simulation Language (DSL) in developing detailed switching models for power converters in order to use them for harmonic stability analysis.

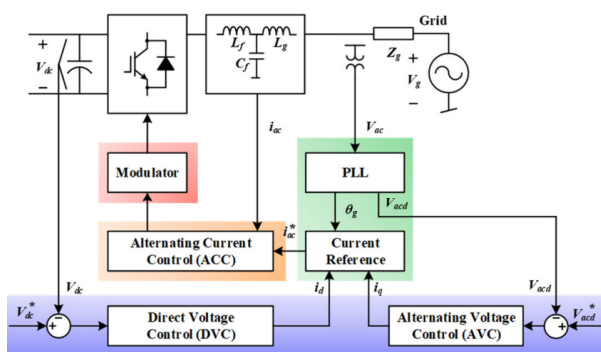


Figure 1: Generic power inverter structure[1].

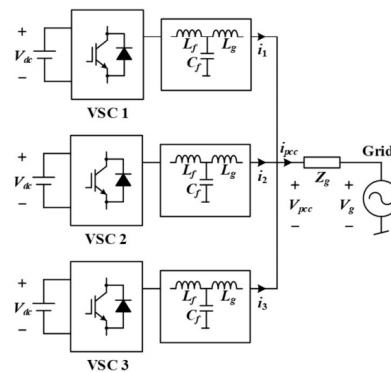


Figure 2: Several converters connected to the grid[1].

Tasks

- Develop a generic detailed switching model of a power inverter using Power Factory DSL.
- compare the results of the developed model in terms of accuracy and computational time with an already built inverter model using PLECS Blockset.
- Utilize the developed model in simulating the interface of several power inverters into a low voltage distribution grid and analyze its effect of the harmonic stability of the system.

References [1] X. Wang and F. Blaabjerg, "Harmonic Stability in Power Electronic Based Power Systems: Concept, Modeling, and Analysis," in IEEE Transactions on Smart Grid.

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