CRESYM BiGER project

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A single-VSC benchmark system

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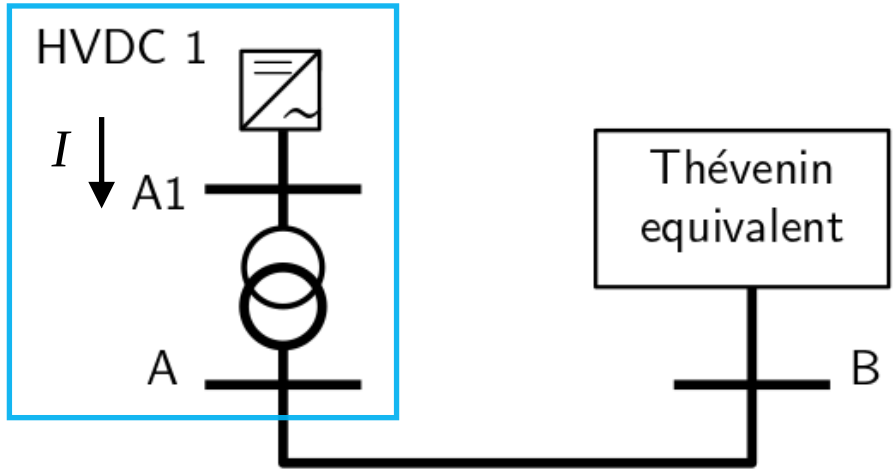
Main characteristics and initial operating point

Voltage-Source Converter:

- Same model and parameters as HVDC1 in the 4-VSC benchmark system (1200 MVA)
- Operating point different from that in the 4-VSC system



Thévenin equivalent:

- Constant voltage source in series with a reactance X_{th}
- Brings a short-circuit power of 10 000 MVA at bus B

$$X_{th} = \frac{400^2}{10000} = 16\ \Omega$$

Transmission line

- 400 kV
- approximately 50 km long
- model: simply a series reactance of 15 Ω

Power flow data	Power flow solution
• Bus A : PV bus, P= 1000 MW, V= 1 pu • Bus B : slack-bus, V= 1 pu, θ= 0°	• Bus A : V= 1 pu, θ= 0.093887 rad, P= 1000 MW, Q= 47 Mvar • Bus B : V= 1 pu, θ= 0, P=-1000 MW, Q= +47 Mvar

Initialisation of VSC and equivalent:

Voltage-Source Converter :

- Voltage at bus A1 : 0.99878 pu
- Current I : 0.85093 pu (1200 MVA base)

Thévenin equivalent :

- Internal voltage : 1.00966 pu

Suggested disturbances:

1. Decrease of active power setpoint of HVDC1 by 0.05 pu (60 MW)
2. Increase of voltage setpoint of HVDC1 by 0.02 pu
3. Zero-resistance short-circuit at bus B cleared in 150 ms with no change in network

All applied at t= 0.1 s

Input files for STEPSS:

- lf.dat : power flow data
- dyn.dat : dynamic data
- settings.dat : simulation settings
- events.dst : disturbances
- obs.dat : observables
- sim.cfg : configuration file (path of files to be adjusted)