

8-Bus 8-Machine HVDC network

Keywords: Electromechanical stability, Transient analysis, 12-pulse HVDC link, Kundur network, Alternators with controls and power stabilizers

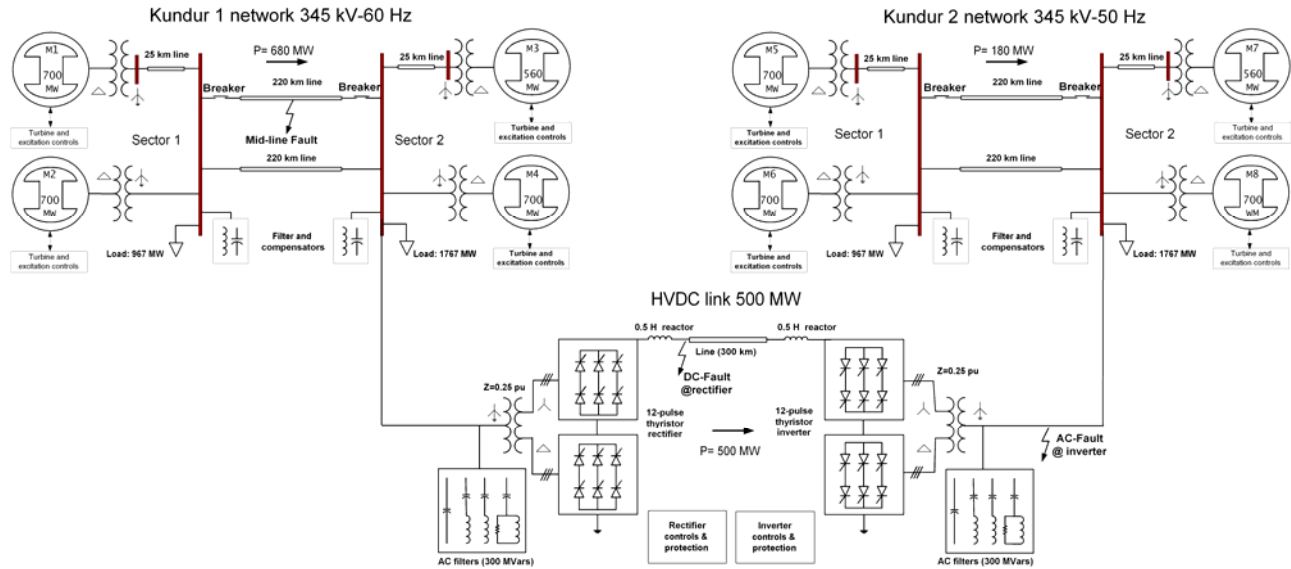


Figure 1. 8-bus, 8 machine, HVDC network

This demo is an 8-bus, 8 machines network with a 12-pulse HVDC link. The network is composed of two 4-machine Kundur systems connected together with a 12-pulse HVDC links.

Each of the two Kundur power systems consists of two fully symmetrical areas linked together by two 230 kV lines of a 220 km length. An HVDC link rated at 500 MW (500 kV, 1kA) connects these two Kundur network. A 300 km distributed parameter line connects the two ends of the HVDC link. The rectifier and the inverter of the HVDC are 12-pulse converters. Other interesting characteristics are listed next:

- Each machine is a 6 states synchronous machine model.
- Each machine has its own controller and power stabilizer.
- Single/multi-phase faults can be modeled on the system as well as thyristor misfires.

The electromagnetic transient type of simulation made in RT-LAB enables the study of fast and detailed phenomena like single-phase faults in the Kundur network and observe their effects on a larger time scale, i.e. on the electromechanical scale, like inter-area power oscillations and HVDC link controllability. These test results can be observed on the Opal-RT **TestDrive** interface, a convivial LabView-based GUI that enables dynamic signal view selection with scripting capabilities.

This complete model runs under RT-LAB on a dual-core dual-CPU Opteron 2.2 GHz PC at a real-time step size of **40 microseconds**.

System configuration	
Hardware enclosure	HILBox
Software modules	ARTEMIS
Additional models	DT, DPL, Stubline
Package	E