

Title: Kundur's Two Area network implementation in Modelica using the OpenIPSL

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Abstract:

Modelica implementation of Kundur's two area network using the OpenIPSL library is shown in Figure 1. While Figure 2 shows the simulation result of the voltage profile at three buses when a three phase balanced fault is simulated during 1 to 1.05 seconds at the bus B8.

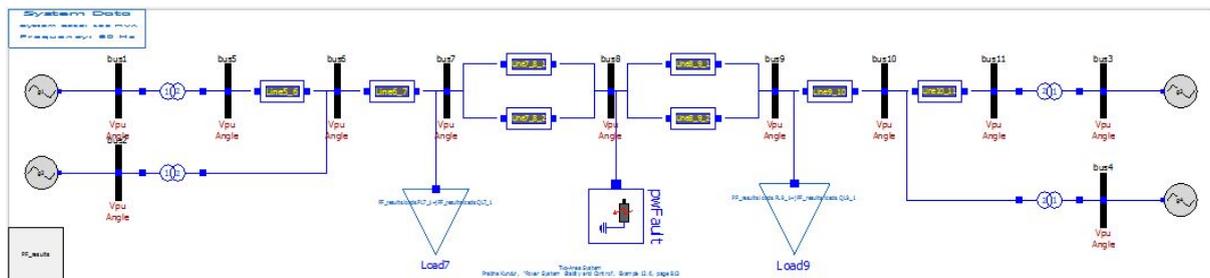


Figure 1: Implementation Kundur's two area system using OpenIPSL

To run this simulation in your favorite Modelica tool, e.g. Open Modelica, follow the steps below:

1. Open the file "TwoAreas.mo".
2. Upload the **OpenIPSL** library package.
3. Go to the "Simulation" tab of your tool, and click the "Simulate" button.
4. The simulation result of the bus voltages at B7, B8 and B9 should be similar to the one shown below.

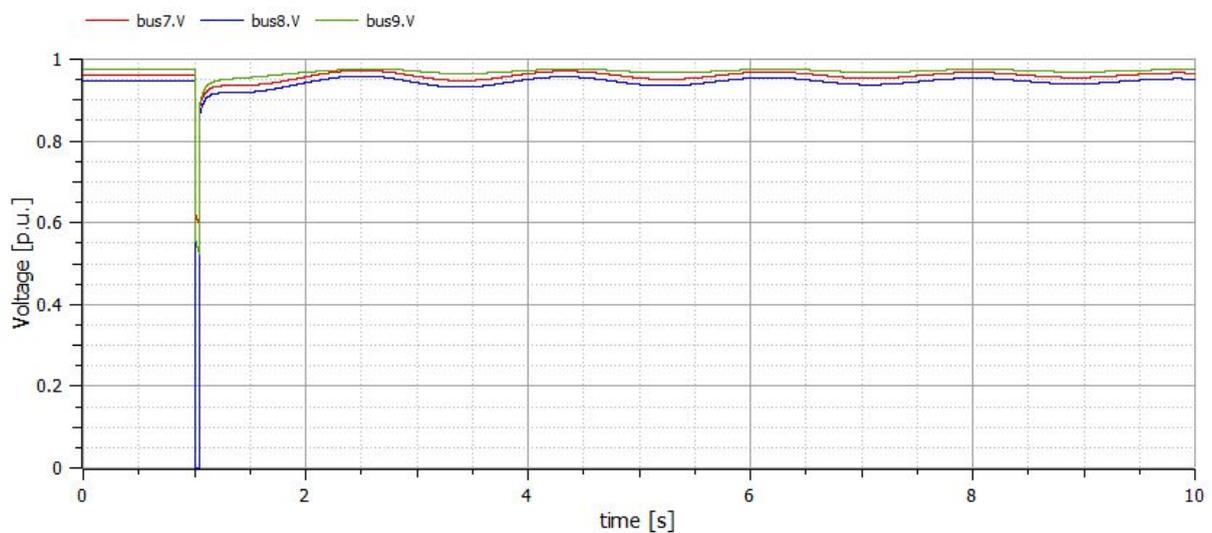


Figure 2: Voltage profile of load and fault bus

Description of the simulation:

The Kundur's two area model is used to study the small signal stability at different buses which is implemented in the Modelica language using the OpenIPSL library. From Figure 1, it can be seen a three- phase balanced fault is simulated at bus B8 during 1 to 1.05 seconds. The voltage profile of different buses is plotted in Figure 2. Observe from the voltage profile that, as soon as the fault occurs the bus voltages reduces to zero until the fault is cleared. After the fault is cleared at 1.05 seconds, the bus voltage recovers, however it becomes oscillating. The generator models in the implemented network use PSAT synchronous generators of order VI. For all generator models it is considered that the field voltage remains constant.

Conclusion:

The implemented model in Modelica represents the system behavior of Kundur's Two Area model before and after the fault occurs at the bus B8.