

ELECTRIFIED POWER SYSTEMS LIBRARY

Model & optimize electric supply systems



MODELING AND SIMULATION OF AC/DC SUPPLY SYSTEMS

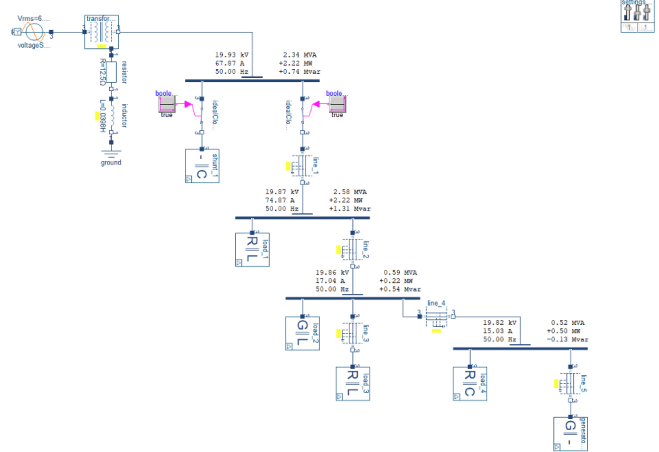
The Electric Power Systems Library (EPSL) is intended to simulate AC-power systems efficiently based on (dynamic) phasors. This concept – optionally – allows combining the well-known advantages of phasors-based computation like quick computation of AC-quantities with dynamic effects of energy-storing elements. As an extension to dynamics, it is possible to create DC/hybrid systems and investigate system properties with higher harmonics.

APPLICATION

Typical applications of the EPSL are load-flow calculations of comparably small networks like micro grids or mobile supply systems like ships or airplanes, focusing on detailed investigations like dynamic effects or combined AC/DC systems.

Electric airplane supply systems are a very typical application due to the comparably high frequency. Therefore, the EPSL provides multiple components typically used in airplanes, like autotransformer rectifier units.

Electrically connecting EPSL components with the Modelica Standard Library (MSL) is possible with the respective adapter for DC-parts of the supply system. This enables a wide variety of components to be reused. Other interfaces like thermal or mechanical are directly used from the MSL and can therefore be seamlessly connected.



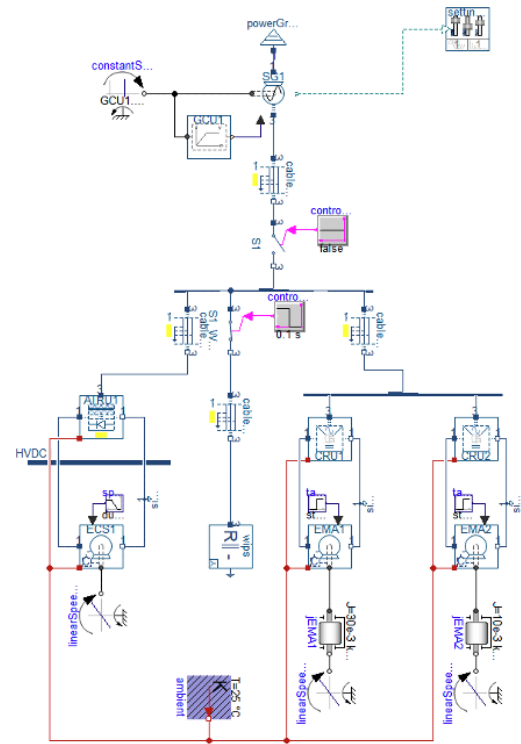
Medium voltage AC supply systems

BENEFITS

- Phasor description allows quick simulation performance independent of AC-system frequencies
- Expandability with customer specific models
- Visible model code for simple modification of existing models
- Direct coupling to other Modelica libraries for investigation in multiple technical domains

KEY FEATURES

- Multi-level description of many components allow switching between quasi steady-state and dynamic analysis
- Variable or fixed base-frequency
- Mixed AC/DC (=hybrid) systems possible in a single model
- DC-part can be coupled with Modelica standard library
- Steady-state initialization of AC models



MOET-like electrical aircraft supply-system

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