CYME
Power Engineering Software and Solutions

Secondary Grid Network Analysis

Understand the issues related to secondary networks through modeling and analysis

Secondary networks are designed to provide reliable power distribution to highly dense load areas through redundancy based on different interconnection possibilities.

The CYME Secondary Grid Network analysis module allows the modeling of any spot network and secondary grid, and is equipped with robust power flow and short-circuit algorithms to analyze such heavily meshed networks.

The planning and operation challenge of secondary grids resides in its unique and complex topology developed to ensure high power availability and reliability for sensitive and critical loads.

Such challenge brings along the need to model the grid with all its key components and to have robust algorithms to cater for heavily meshed networks.

The CYME Power System Analysis software brings the technologies together and is the perfect tool for any secondary grid network analysis.

Detailed modeling

The Secondary Grid Network Analysis module offers the capacity to model the important components of any spot network and secondary grid. It includes the representation of feeders, transformers, network protectors, cables, and loads.

The complexity of the secondary grid modeling is made easy through the CYME software's user-friendly interface, of its intuitive drag-and-drop operations and its many editing tools and functionalities. The secondary grid or the spot network can be presented in a separate view to offer better visualization while maintaining the geo-referenced view of the rest of the distribution system.

Distribution System Analysis

Once the secondary grids are modeled, the power, refinement and robustness of the CYME calculation engines is fully revealed:

- Unbalanced Newton-Raphson load flow method for the analysis of unbalanced heavily meshed networks
- Short-circuit analysis of secondary grids
- Evaluation of the state of the network protectors with complete relay settings based on the operating condition (backfeed, contingency, etc.)
- Integration of Distributed Generation (DG) into the secondary grid
- Contingency scenarios study
- Conductor resistance adjustment based on temperature is taken into account for both load flow and short-circuit analyses making the calculations on spot networks and secondary grids more accurate

EATON
Powering Business Worldwide

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Network Protector

The network protector is a key component of secondary grids and spot networks as it prevent back-feeding to the primary distribution circuits. The Secondary Grid Network Analysis module provides the ability to model the network protectors with complete relay settings which include trip functions and close functions (based on Eaton's MPCV relay and on Richards Manufacturing/ ETI MNPR®).

Trip functions include:

- Insensitive
- Remote Open/Block Open
- Sensitive
- Sensitive Plus Non-Sensitive
- Time Delay
- Watt-VAR
- Delayed Watt-VAR

Close functions include:

- Straight Closing Curve
- Circular Closing Curve
- Relaxed Closing Curve

Polar plots are available to provide graphical visualization of the trip and close regions.

Distributed Generation

The complexity of secondary grid analysis increases with the integration of distributed generation. The CYME Power System Analysis software supports the modeling of distributed power resources such as photovoltaic panels, and synchronous and induction machines. Being able to include distributed generation into the network model would allow a more comprehensive study in the goal to maintain a proper grid operation.

Load Flow Contingency

With the optional CYME n-P Load Flow Contingency module, the power engineer can create n-P type contingency events and single or multiple-outage scenarios in a few mouse clicks.

Single or multi-contingency scenarios which take into account of the automatic operation of network protectors can be simulated to study the effect of the loss of a combination of feeders, transformers, cables or any other network component.

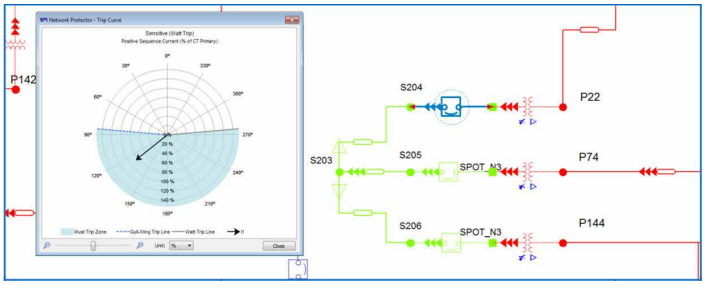
Distribution State Estimator

The optional Distribution State Estimator module is a robust algorithm for the estimation of load and power flow in order to provide more detailed network models. It considers different measurement types such as power and voltage meters, handles measurement redundancy and identifies errors in topology while performing the required load estimation. The module is capable to solve for heavily meshed networks such as secondary grid networks and it takes into account distributed energy resources.

Sub-networks modeling

More accurate simulation results lead to the more precise planning and management of the expansion and maintenance of the distribution system, and a greater facility to manage the integration of the Distributed Generation (DG) and Distributed Energy Resources (DER) in the power grid; saving time and money.

The Sub-Networks Modeling module is included with any of the other CYME circuit/ system modeling modules, and shares similar features. It supports the creation of any sub-network, including utility vaults, switching cabinets and modular substations; DG and DER components, in a nested representation connected to the overall grid.



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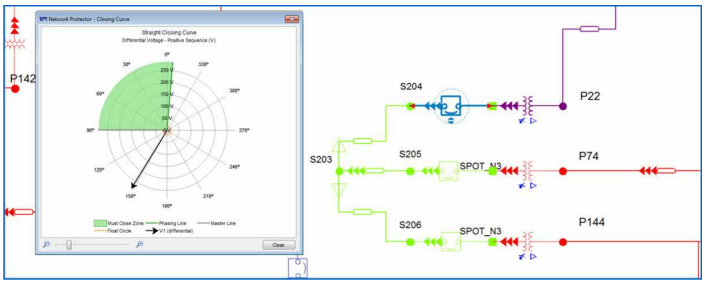

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