

Release 5.1

EUROSTAG® Release 5.1 continues with the successful concepts of the *EUROSTAG®* software while adding new powerful features improving the business processes of network planners, network operators, consultants and researchers.

HVDC

After focussing on distributed generation in *EUROSTAG® - 4.3*, on user-defined automats, protective devices, wind turbines and combined cycles in *EUROSTAG® - 4.5*, the central theme of the new release, *EUROSTAG® - 5.1*, is HVDC technology. HVDC systems are increasingly used for interconnections and wind power connections, and even allow for the development of supergrids. The growing importance of HVDC technology in power systems calls for accurate modelling and detailed calculations:

- The Load Flow computation module has been completely rewritten: the AC and DC systems are now solved simultaneously, thus greatly increasing the user friendliness. The component library, which already contained a CSC model, has been enriched with a VSC model. *EUROSTAG®* covers now the full spectrum of HVDC systems, from single links to complex multi-terminal installations.
- An accurate dynamic VSC model has been developed. The model supports multi-terminal systems. True to the *EUROSTAG®* philosophy, the model is extremely flexible, and allows for the modelling of complex multi-terminal HVDC systems.
- A new exercise has been added to the tutorial, covering the whole process of HVDC simulation from the Load-Flow configuration to the dynamic simulation.

New and improved static modelling

New equipments and functionalities have been added in the static model. In addition to the HVDC modelling extension, we also added the SVC while supporting new regulation modes for generators (voltage of step-up transformer) and transformers (flow). These new equipments and developments allow a more realistic modelling of the system, a better compatibility with international standards (CIM and PSS/E for example) and an easier integration of the static and the dynamic simulation model. The PSS/E import has been updated and is now supporting the last version (33). These new functionalities open the door to a more advanced and easy system modelling.

The EUROSTAG API: The way to automate the simulation and the control of your system

Dynamic simulations are now more and more used as part of a whole process dedicated to complex control algorithms to improve and to optimize the system operation. *EUROSTAG® - 5.1* is now delivered with an Application Programming Interface (API) allowing the integration of the power of *EUROSTAG®* dynamic simulation engine into an external process. With this API, the simulation can be controlled from an external program or script implemented in Matlab, Python, C++ or any platform able to use a win32 DLL. A scenario can be played, paused and restarted after having retrieved all the necessary information from the system and the behaviour of the dynamical simulation can be modified in every moment based on the control actions calculated in the external program.

This new API opens the doors for new applications to better control and optimize your system.

CIM compliance

RTE and TE actively collaborate to the definition of the dynamic extension of the CIM ENTSO-E profile. In addition to the already supported CIM ENTSO-E profile Revision 1, *EUROSTAG® - 5.1* proposes the import and export of dynamic standard models in the 2012 draft of the CIM ENTSO-E profile Revision 2. In the frame of this CIM version, several standard models (turbine governor, system stabilizer, excitation system, mechanical and static load) have been added to the standard model library and can be directly used.

Enriched and more flexible macro-language (user-defined modelling)

In complement of the static modelling enhancements, a new block, the "Variable limits integrator" has been added to the Eurostag macro-language. This will allow for a better support of the CIM standard models. The "Simple lag" and "Limited Simple lag" blocks are now accepting a zero time constant. This allows also for a wider compatibility when importing models from other software and increases your productivity.

Userfriendliness

The use of user-defined models becomes day after day more current and their complexity grows as well.. Providing support to the user for problem analysis becomes a priority. In case of failure of the simulation, sufficient information has to be provided to the user to enable him to understand what happened and possibly adjust its model or simulation parameters to address them.

In the Post-processor, the "Curve follower" functionality has been enriched with a measure tool allowing a better curve analysis. The COMTRADE (Common format for Transient Data Exchange for power systems) format is now supported for export.

New functionalities in the Network Editor

In order to ease the one line diagram drawing, the list of the connected equipments is provided by the new "connectivity analysis" functionality. Several additional useful functions are introduced as the deletion of a graphical object without deleting the electrical data, the possibility to display the name of the equipments in their cartridge,... All the parameters of the cartridge configuration are now saved. Combined with the saving of the five latest configuration used, analyzing results in the Network Editor is much more easy and efficient.

Thanks to the expertise of the power systems engineers and developers teams of Tractebel Engineering and RTE, directly involved in complex power system exploitation, the new features developed for the release 5.1 will contribute to make *EUROSTAG®* a unique worldwide reference for dynamic simulation.

For more information, please contact us:

TRACTEBEL ENGINEERING
7, avenue Ariane
B-1200 Brussels – BELGIUM
www.tractebel-engineering-gdfsuez.com

Christian Merckx
Tel. +32 2 773 86 62
christian.merckx@gdfsuez.com