OPF-RA   Remedial Action Determination Using OPF

OPF-RA is an add-on module for VSAT. It can help identify measures to alleviate thermal and voltage stability violations of a power system under pre- and post-contingency conditions.

OPF-RA is integrated with VSAT, providing a user-friendly interface and seamless interaction with VSAT models and data, as well as the relevant VSAT analysis options. The resulting powerflow case with the RA implemented can be directly opened by other DSA*Tools*™ modules for further studies.

APPROACH

Whereas conventional remedial action studies for resolving thermal and voltage insecurity issues rely on significant human effort by systematically adjusting system control settings to reach a satisfactory solution, OPF-RA formulates and solves an optimal powerflow (OPF) problem, which automatically determines the appropriate remedial actions enough to bring the system back to security, based on a set of user-defined controls and system operational criteria.

OPF-RA is based on the following techniques:

- Full AC OPF formulation
- Robust primal-dual interior-point solution algorithm

Control measures incorporated into OPF-RA:

- Generator voltage settings
- SVC/shunt voltage settings
- Switchable shunts
- Transformer taps
- Generator active power dispatches
- Load shedding

Types of constraints enforceable in OPF-RA:

- Bus voltage limits
- Branch thermal limits (MVA, Ampere, MW, MVAr)
- Interface flow limits (MVA and MVAr)
- Generator MW and MVAr limits
- Switchable, continuous/discrete shunt limits
- Transformer tap limits
- Load shedding limits
- All contingencies supported by VSAT

APPLICATIONS

OPF-RA's fast and efficient solution algorithm allows system planners and operators to solve various power systems problems, such as:

- Relieve base-case and post-contingency thermal and voltage stability violations
- Maximize system power transfer capability
- Improve system voltage profile
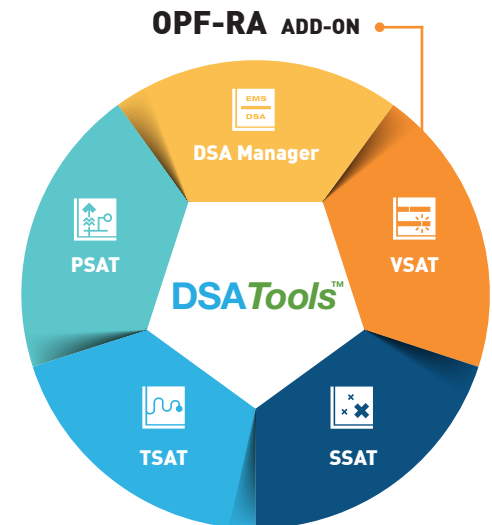
PRODUCT FEATURES:

- *Fully integrated with VSAT in terms of UI, input data compatibility, and computation engine*

- *Identification of remedial actions to resolve thermal and voltage stability violations*

- *Complementary to the existing sensitivity-base RA method in VSAT*

- *Capable of handling systems of very large size (up to 100,000 buses)*

- *Robust and highly efficient solver*

- *Customizable optimization and solution parameters*
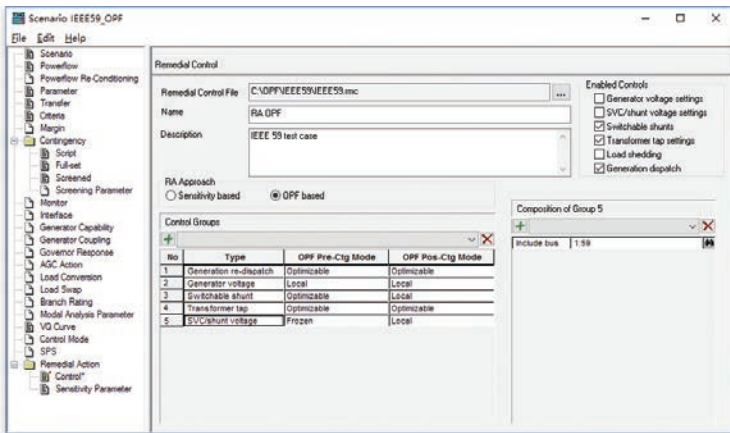
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OPF-RA Control Selection Dialog
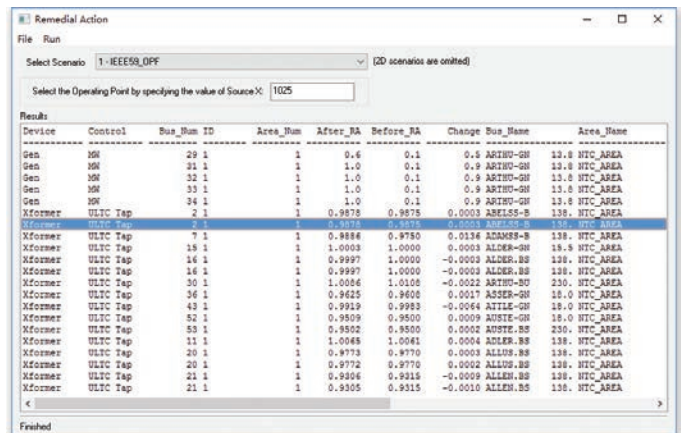
OPF-RA Solution Result Display Window

SPECIFICATIONS AND REQUIREMENTS

- Runs on MS Windows 7/10/server 2012 R2/server 2016

- Requires VSAT to run

OTHER POWERTECH SERVICES

- Licensing of the power system analysis software package DSA*Tools*™

- Licensing of other software products for utility applications

- Implementation of on-line dynamic security assessment (DSA) systems

- Development of custom software systems

- Development of models for use in power system analysis

- Generator field testing, model development and validation

- Training

- Technical consultancy studies including

  - Development of power system base cases

  - System planning and operation studies

  - Facility (including renewables) interconnection studies

  - Compliancy studies (such as NERC TPL, CIP, UFLS, etc.)

  - Post-mortem analysis of system disturbances

ABOUT POWERTECH LABS

Powertech Labs Inc. is one of the largest testing and research laboratories in North America, situated in beautiful British Columbia, Canada. Our 11-acre facility offers 15 different testing labs for a one-stop-shop approach to managing utility generation, transmission and distribution power systems.

Outside of the utilities industry, Powertech provides routine testing capabilities, product development, research and consulting services to support an array of industrial-type operations, electrical equipment manufacturers and automotive original equipment manufacturers.

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