

PSCAD V5

A General Overview of PSCAD V5

John Nordstrom, M.Sc., P.Eng.

pscad.com

Powered by Manitoba Hydro International Ltd.

Development Philosophy

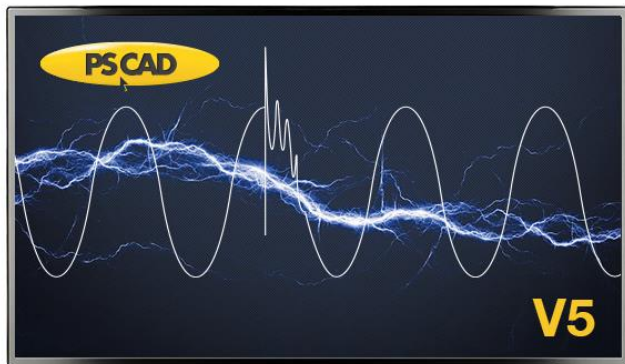
- With the advent of renewables and their complex controllers, Electromagnetic Transients (EMT) simulators have advanced beyond a design and problem solving tool for small, localized systems. EMT simulations are now a necessity in the design of large electric grids.
- In this new era, PSCAD V5 harnesses the power of parallel computing, enables powerflow data migration, includes algorithmic simulation speed improvements for large systems and permits full application automation via Python scripting. These new features ensure that the simulation of large electric networks, is faster and more efficient than ever.





PSCAD V5

Quick Look



PSCAD V5

Includes new functionalities and can be fully automated through the embedded Python scripting language interface. With most of our existing and familiar features refactored to function more efficiently, PSCAD V5 enhances the user's overall experience.

Sales Desk: sales@pscad.com



PSCAD V5 Enhanced

Includes additional modules:

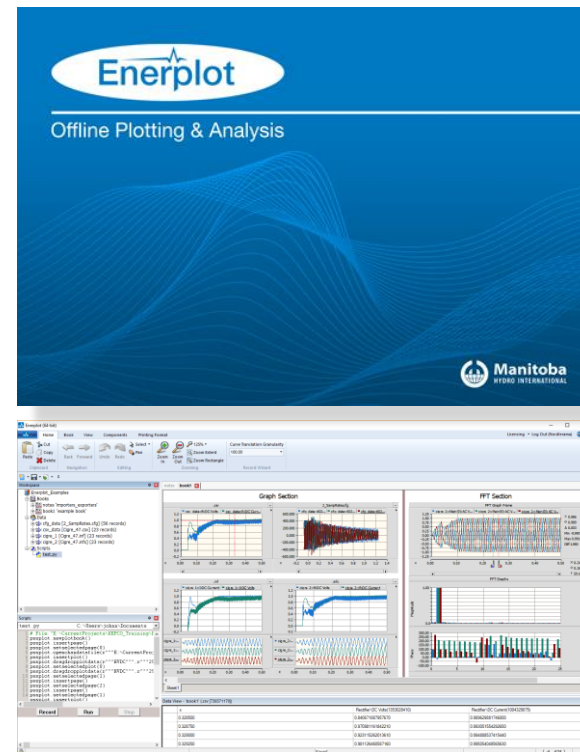
- PRSIM™
- PSCAD Initializer
- Enerplot™

ENERPLOT™

Process Data Quickly and Efficiently

Enerplot™ is a fully automatable application that allows you to perform highly repetitive tasks at lightning speed.

- Automated scripting with embedded Python interface. Includes recording.
- Powerful, embedded math parser for creating and modifying new and pre-existing curves;
- Fast-Fourier Transform (FFT) analysis tools;
- Ability to template projects when performing similar studies;
- Quickly switching between curves by toggling references and loaded datasets;
- Loading huge data files in seconds with the lazy-loading feature;
- **Videos:** *Enerplot* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.



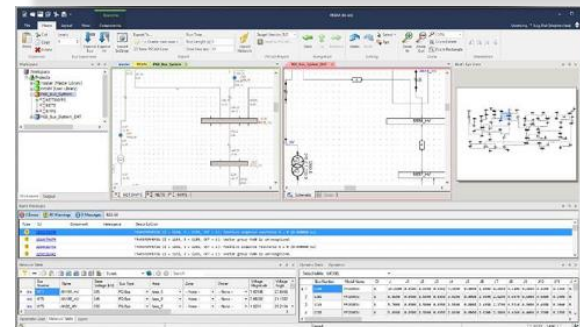
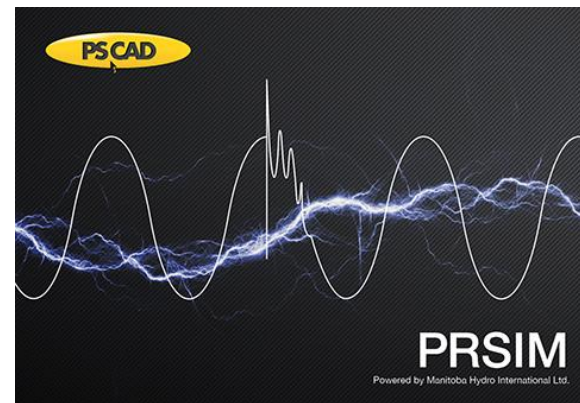
PRSIM™

Power System Importer

The PRSIM application allows users to convert standard PSS/E or PowerFactory network data to PSCAD with minimal time and effort:

- Convert PSS/E and PowerFactory data files to PSCAD V5.0 and V4.6
- Import detailed dynamic, sequence, location data for automatic schematic expansion
- Form network equivalents for unexpanded segments of the network
- Re-initialize previously generated PSCAD projects

PRSIM/Initialization Focused Webinar to be Broadcast: [February 17, 2021](#)



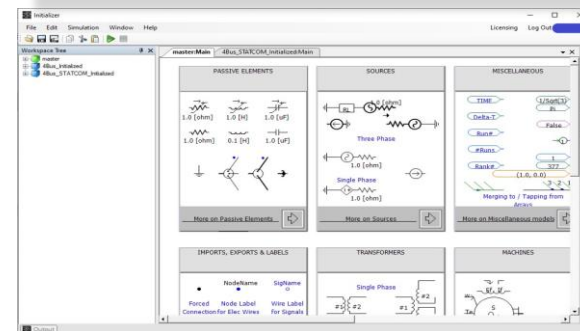
PSCAD Initializer

Initialization of EMTDC from a Power Flow Result

An Electro Magnetic Transient (EMT) program such as PSCAD simulates the behaviour of a power system network after a disturbance, such as a fault or a circuit breaker operation. During this short period, the system gradually changes from one steady-state behaviour to another.

- The purpose of the PSCAD Initializer is to set up the proper power flow conditions (e.g. correct voltage and angles at buses, active, reactive power flows between buses, etc.) prior to the disturbance. This involves a solution to the power flow equations and setting up the correct parameters of generators, sources in PSCAD, etc.

PRSIM/Initialization Focused Webinar to be Broadcast: **February 17, 2021**





PSCAD V5

Quick Look at PRSIM

Customer Resources

- **Website:** www.pscad.com
- **Knowledge Base** (<https://www.pscad.com/knowledge-base>): A searchable environment where we place all of our help resources. Topics include everything from engineering application examples, to installation and licensing guides.
- **Video Tutorials** (<https://www.youtube.com/user/PSCAD1>): We invite everyone to subscribe to the PSCAD YouTube Channel, which contains 80+ videos ranging from engineering applications of PSCAD, to product feature demonstrations.
- **PSCAD Web Help** (<https://www.pscad.com/support/support-resources>): The PSCAD Application Help can be accessed online from within PSCAD support section.
- **Support Services Desk** (support@mhi.ca): Access our team of experienced, world-class engineers and technical specialists for help ranging from engineering study applications, to installation and licensing.



Customer Resources

- **Customer Portal:** MyCentre (<https://mycentre.hvdc.ca/>)
- **Q & A Forum:** To access the forum, you must first register a MyCentre account. If you already have a MyCentre account, then simply log in and click the PSCAD Q&A tab in the tab bar.
- **PSCAD Free Edition:** We offer a free edition of PSCAD for the express purpose of trying out the product. Many of the functionalities are restricted.
- **PSCAD/PRSIM/Enerplot Trial Licenses:** We offer limited time trial licenses to those more serious users who want to try out the full functionality of our products before they buy.
- **PSCAD/PRSIM/Enerplot Beta Testing Programs:** Our unreleased software products are continuously being updated. We are constantly working towards our development goals, but often we will add new features based on customer requests. Contact our **Support Desk** to request to be added to our Beta Program (support@mhi.ca)



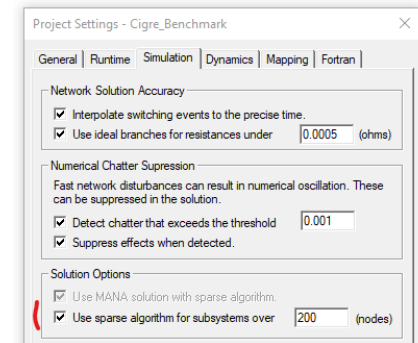
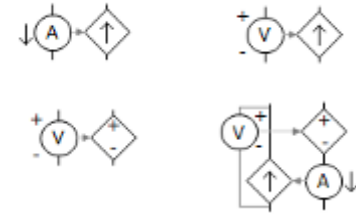


PSCAD V5

EMTDC Enhancements and Master Library New Models

EMTDC Algorithmic Enhancements

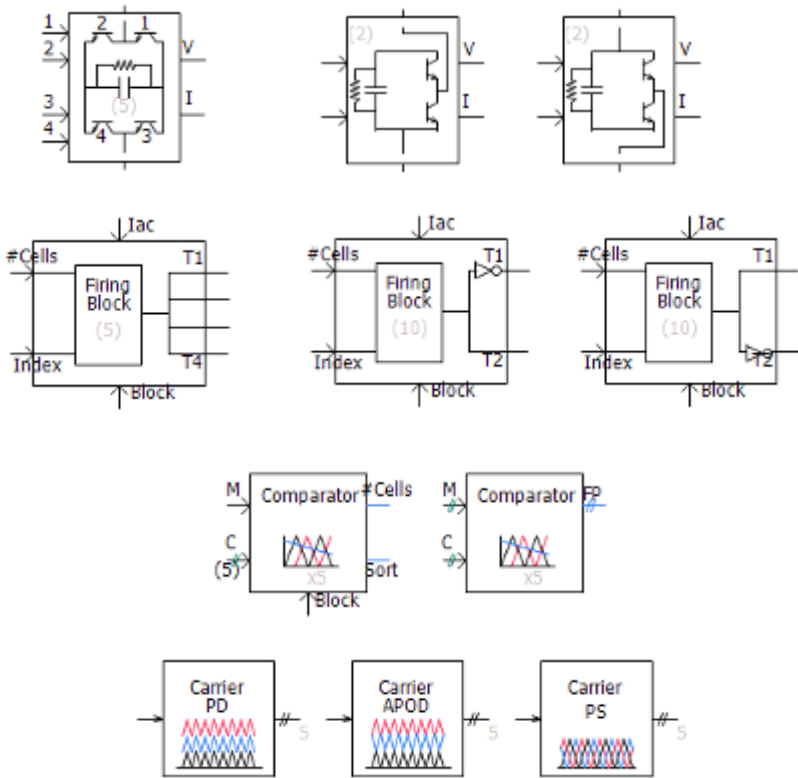
- **Modified Augmented Nodal Analysis (MANA):** Helps to mitigate some of the problems in classical nodal analysis, such as the difficulty of representing dependent sources, some of which are now included as a part of the master library.
- **KLU Sparsity Algorithm:** KLU is a software package for solving sparse linear systems of equations that arise in circuit simulation applications. EMTDC now uses the KLU algorithm for larger subsystems. The matrix size where KLU comes into solving the equations can be set by the user. The default is **200** nodes.
- **EMTDC and Master Library Models Focused Webinar to be Broadcast: March 3, 2021.**



MMC Model Library

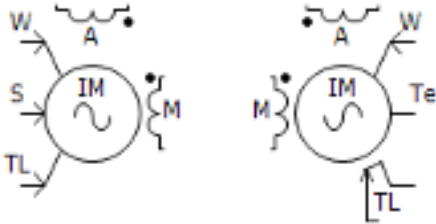
PSCAD V5 includes a library of Modular Multilevel Converter (MMC) component models:

- **Full and Half-Bridge Cells:** Use Thévenin equivalent circuits, which significantly increases the computational efficiency.
- **Firing Signal Generators:** Generate firing signals for half-bridge cells, based on the capacitor voltage balancing algorithm.
- **Multi-Dimensional Comparator:** Compares modulating waves against carrier waves generated by Carrier Signal Generator, and outputs control signals to MMC cells.
- **Carrier Signal Generator:** Generates a vector of PWM carrier signals for a specified fundamental frequency.



Machines

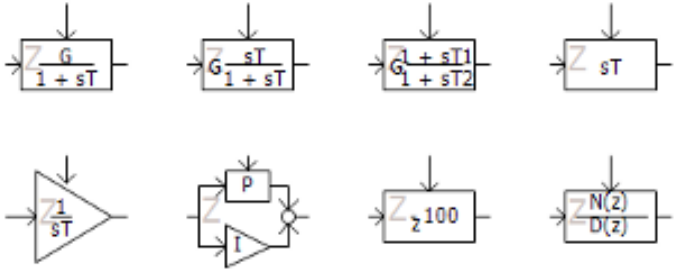
- Single-phase Induction Machine.



Z-Domain (Discretized) Controls

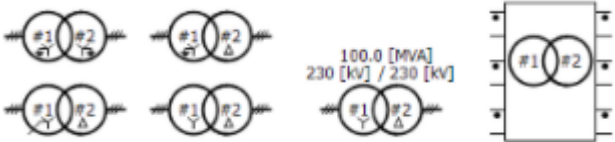
A library of eight, commonly used controls components are included in the master library:

- Delay
- Derivative
- Differential Pole
- Integrator
- Lead-Lag Pole
- Transfer Function
- PI Controller
- Real Pole



Transformers

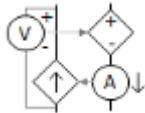
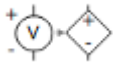
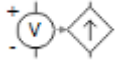
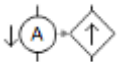
- 1-Phase, Multi-Winding (5-12), Transformer:** Models a single-phase, ideal transformer that can be configured to model from 5-12 windings.
- 3/5-Limb, Duality-Based Transformer:** Represents a mode of a 3-phase, 2-winding transformer, based on the principle of duality. It can be used to model a multi-limb transformer or a bank of single-phase transformers.
- Hysteresis Reactor:** Can be connected to a single-phase or 3-phase node.



Sources

PSCAD V5 includes a new current source model, as well as a collection of dependent source component models.

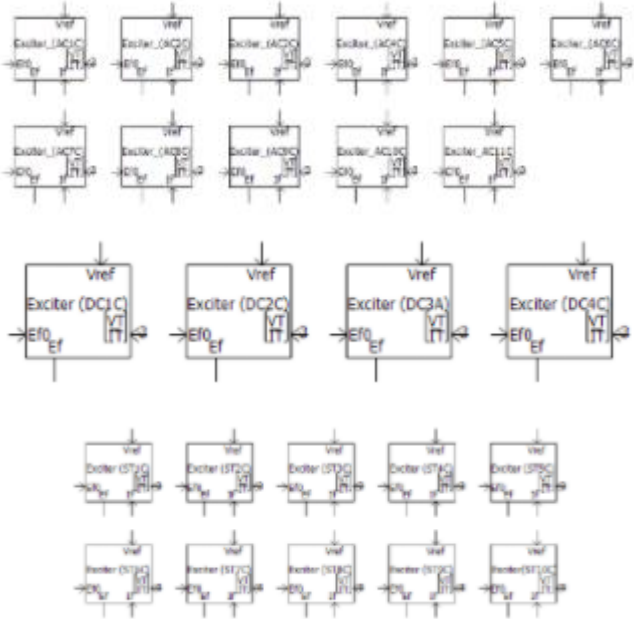
- **3-Phase Current Source:** Models a 3-phase, positive-sequence, ideal AC current source.
- **Current-Dependent Current Source:** A single-phase or three-phase, scalable current-dependent current source.
- **Voltage-Dependent Current Source:** A single-phase or three-phase, scalable voltage-dependent current source.
- **Voltage-Dependent Voltage Source:** A single-phase or three-phase, scalable voltage dependent voltage source.
- **Ideal Ratio Changer:** A single-phase or three-phase, scalable ideal ratio changer (i.e. a combination of voltage-dependent voltage source and a current-dependent current source).



2016 IEEE Standard Exciters

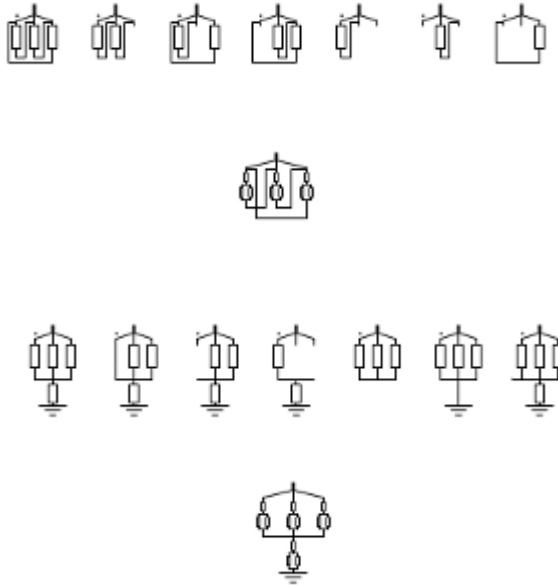
AC, DC and Static Exciters in the master library have been upgraded from the previous 1992, to the revised IEEE standard 421.5-2016.

- **AC Exciters:** Includes AC1C, AC2C, AC3C, AC4C, AC5C, AC6C, AC7C, AC8C, AC9C, AC10C and AC11C models.
- **DC Exciters:** Includes DC1C, DC2C, DC3A and DC4C models.
- **Static Exciters:** Includes ST1C, ST2C, ST3C, ST4C, ST5C, ST6C, ST7C, ST8C, ST9C and ST10C models.



Loads

- Individually Configurable, Delta-Connected Load:** Each branch can be individually selected to be any series combination of R, L and C elements, or as an open branch.
- Individually Configurable, Delta-Connected, 3-Branch Load:** Each leg is a combination of two, parallel branches in series with another branch. Each branch can be individually selected to be any series combination of R, L and C elements, or as an open or shorted branch.
- Individually Configurable, Y-Connected Load:** Each branch can be individually selected to be any series combination of R, L and C elements, or as an open or shorted branch.
- Individually Configurable, Y-Connected, 3-Branch Load:** Includes a neutral connection. Each leg is a combination of two, parallel branches in series with another branch. Each branch can be individually selected to be any series combination of R, L and C elements, or as an open or shorted branch.



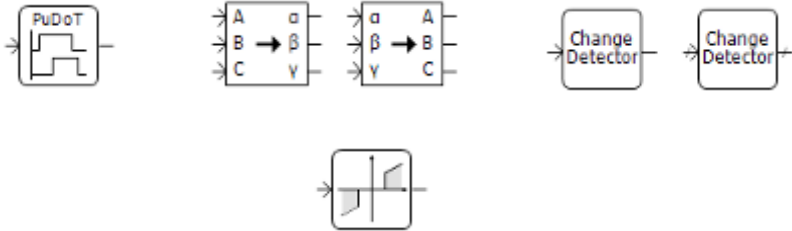
Electrical Branch Models

- **Per-Unit Impedance Branch:** Models a 3-phase passive branch of R, L and C elements. Parameters are entered as per-unit impedances, based on specified base values.
- **Isolation Switch:** Models an isolation switch for electric circuits. The status of the switch can not be changed during the run. The switch is modelled as an infinite or zero impedance branch.



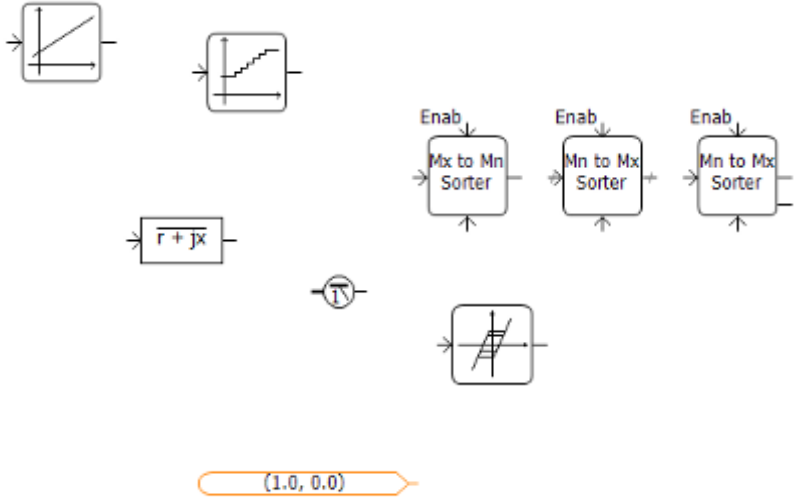
Miscellaneous

- **TRV Envelope Generator:** Generates standardized Transient Recovery Voltage (TRV) curves and outputs violations when the input voltage exceeds the envelope. This is a simplified approach to determining whether a breaker will restrike after a current interruption.
- **Harmonic Signal Generator:** Generates a signal composed of user-defined harmonics of varying magnitudes and phases. Harmonic numbers and associated peak magnitudes and phases can be input through ports as an array signal. Alternatively, the user can specify them from a file.
- **Pick-Up, Drop-Out Timer.**
- **Clark/Inverse Clark Transform.**
- **Change Detector.**
- **Dead-Band Controller.**



Miscellaneous

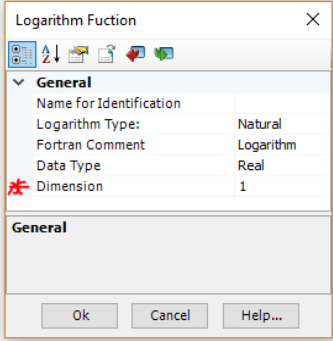
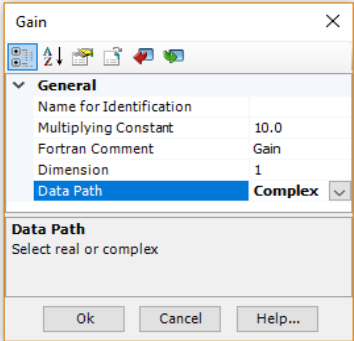
- Scale Changer.
- Discretizer.
- Sort Indexer.
- Complex Conjugate.
- Electrical Phase Tap.
- Backlash Controller.
- Complex Constant.



Master Library

Model Enhancements

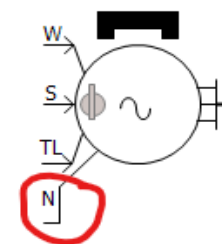
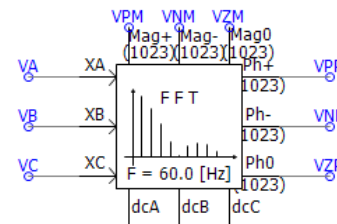
- Complex Signal Support:** Most of the standard controls components (CSMF) have been updated to support the new complex signal type.
- Array Signal Support:** Most of the standard controls components (CSMF) have been updated to support array signal (vector) input and output. All components are by default scalar.
- Multiple Run Additional Recording:** The ability to add a statistical summary to the output file.



Master Library

Model Enhancements

- FFT Enhancements:** The Fast Fourier transform component now provides support for output signals up to 1023 harmonics. A new input parameter has been added to allow enable/disable control of frequency tracking using a signal variable.
- Saturable Reactor B-H Curve:** The Saturable reactor core characteristic can now be represented as a B-H curve, where data is entered Flux Density (T) vs. MMF (A/m).
- Permanent Magnet Machine:** The Permanent Magnet (PM) machine component has been provided with an external connection to the neutral point of the stator windings
- Mutually Coupled Three Wires:** Updated to provide the ability to model a zero-impedance transmission line





PSCAD V5

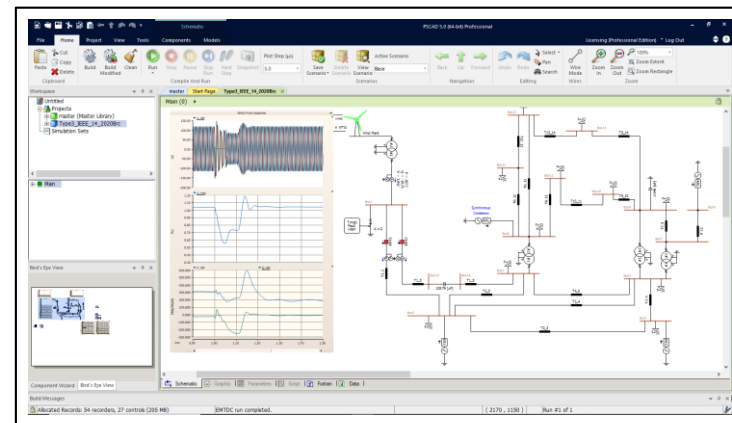
New PSCAD Features and Enhanced Functionalities

pscad.com

Powered by Manitoba Hydro International Ltd.

Important Migration Considerations

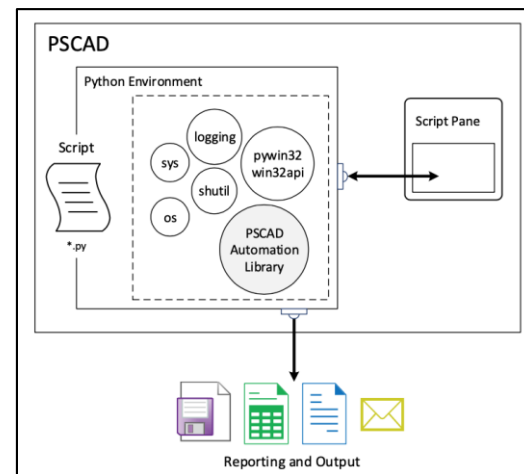
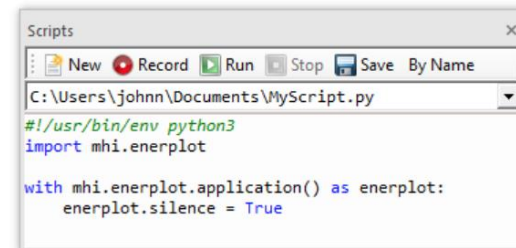
- **Forward Compatibility:** Fully forward compatible with PSCAD v4.6.3. Also supports the direct load of PSCAD X4 (v4.3+) projects, as well as import of older style v4.2.1 projects. A new case is created on import into V5.
- **Backward Compatibility:** Mostly backwards compatible with PSCAD v4.6. Includes a specific *Save as v4.6* function.
- **Fortran Compilers:** GFortran v4.2.1 is out, and Gfortran v4.6.2 and 8.1 are in. IVF compiler versions 9 to 11 are out, versions 16 to 19 are in.
- **Master Library Models:** Note that some master library models have been upgraded and/or bugs fixed, which may change v4.6 simulated results slightly. Important to consider.
- **Resource File Handling:** Completely redesigned in V5.
- **Unit Converter:** The unit converter is forced enabled in V5.
- Read more about these issues in the **PSCAD Application Help**.



Automation

Embedded Python Scripting with Recording

- First introduced with PSCAD v4.6.1, released November 2016.
- In V5, automation utilizing the Python script language is embedded directly into the software and is included with the installation of PSCAD.
- Now users can maintain their scripts from within PSCAD, using a new Script pane, from which custom scripts may be **recorded**, edited or launched.
- A standalone version of the automation libraries is also included with the PSCAD V5 package, if needed.
- **Video:** *Automation Library Features* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.

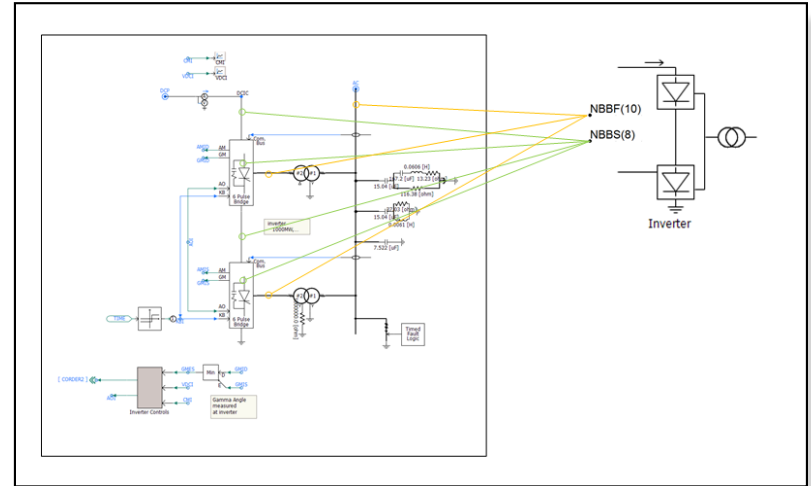
The screenshot shows the 'Scripts' window in PSCAD. It includes a menu bar with 'New', 'Record', 'Run', 'Stop', and 'Save By Name'. The file path is 'C:\Users\johnn\Documents\MyScript.py'. The code content is as follows:

```
#!/usr/bin/env python3
import mhi.enerplot

with mhi.enerplot.application() as enerplot:
    enerplot.silence = True
```

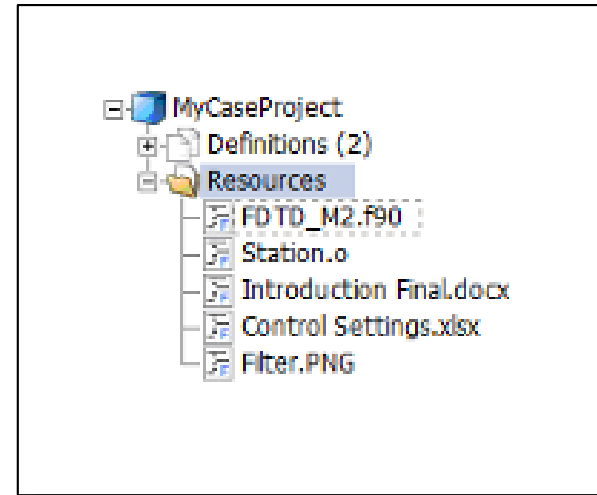
Blackbox Upgrades

- **Electric Network Support:** Electric networks may now be included in a blackboxed component. The new component definition includes prefabricated graphical port arrays to represent the electric nodes, as well as pre-scripted Branch, Transformers and Matrix-Fill segments.
- **Global Substitutions:** Two options: Hard code the literal values, or create global parameters to allow modification after blackboxing.
- **Video:** *Blackbox Features* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.



External Resource File Handling

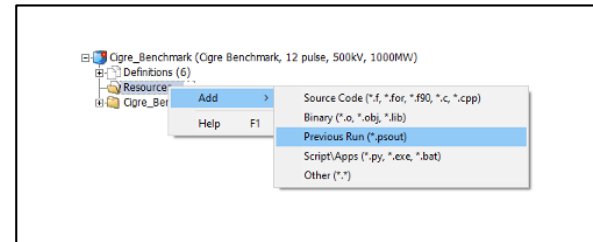
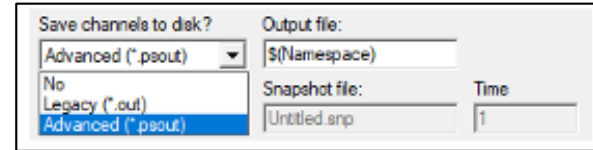
- External source (*.f, *.c) and linking of compiled object and library (*.obj, *.lib) files is no longer accomplished via the project settings.
- All external files associated with a project is now managed via an intuitive, central area called the *Resources Branch*.
- When importing older projects into V5, associated resource files are automatically added to the resources branch for you.
- The *File Reference* component is still supported in V5.
- **Relative Path Resolution:** Specify folders where the compiler should look for dependent files.
- **Video:** *New Resources Feature* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.



EMTDC Binary Output File Format

*.psout

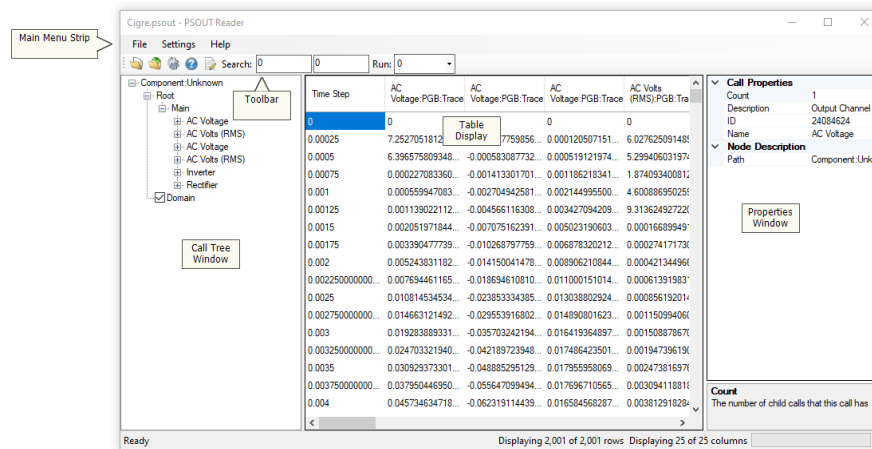
- A brand new EMTDC output file format (*.psout) is included with the PSCAD V5 release.
- Stores all simulation curve and trace data, as well as all sequential or parallel multiple run data, and animated graphics information, in a single file.
- The *.psout can be added as a resource to *the Resources Branch*. From there, old runs can be viewed, including specific runs from a Multiple Run.
- **Video:** *New PSOUT Format* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.



EMTDC Binary Output File Format

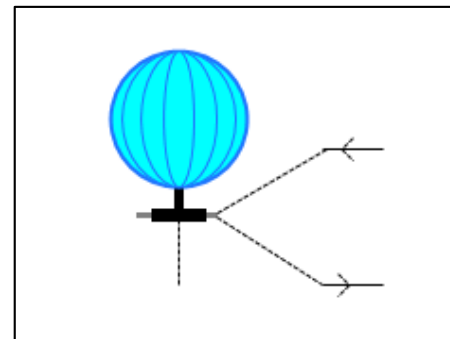
PSOUT Reader Utility

- The EMTDC *.psout file format is binary, and so therefore it needs a special viewer to view the contents.
- PSCAD V5 includes a *PSOUT Reader Utility* to view and manipulate *.psout files. It is accessed from the *Tools* tab.
- Specific channels can be removed from view, and then you may export to the older ASCII *.out format. In this sense, the *PSOUT Reader* can act as a *.out file editor.
- **Video:** *PSOUT Reader* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.



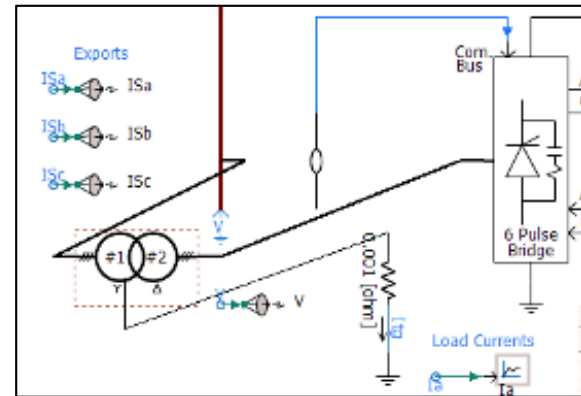
Co-Simulation API

- A general Application Programming Interface (API) is provided with PSCAD V5, enabling EMTDC to link to, and co-simulate with, just about any external application.
- Referred to as the Co-Simulation API, it is in its basic form, a C-language structure called *EmtdcCosimulation_Channel*, which houses a collection c-functions.
- These functions can be used to customize an interface on the external application-side. At the same time, a new master library component called *Cosimulation*, may be utilized in a case project to quickly provide the PSCAD/EMTDC side of the interface.
- **Application Help:** API fully documented.
- For specific help when attempting to use this interface, contact the *Support Desk* (support@mhi.ca)



Rubber Banding (Sticky Wires)

- When either endpoint of this wire is attached to another object (component, bus or another wire), the wire's endpoint will 'stick' to the object.
- If the object is moved, the wire endpoint will remain stuck, and the sticky wire will stretch (like a rubber band), as the object to which it is attached is moved around.
- **Video:** *New Wires Feature* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.

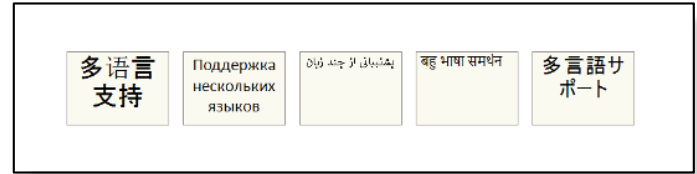


Smart Paste

- **Output Channels:** Paste over a graph, and a curve will be created; paste on the schematic canvas to copy the component; paste over a blank graph panel and a new graph containing a new curve will be created; paste over a control panel to create a new meter interface.
- **External Text as Sticky Note:** Text copied from an external file, such as Microsoft Notepad or Word, is now formed directly as a sticky note, when pasted on the schematic canvas
- **Multi-Select Copy Transfer:** Select a single module or multiple modules and select copy. Paste transfer into same project or a new project.
- **Layer Information:** All layer information is now included when a component is copied. On paste, the layer state will be maintained. If the layer exists already, the component is added to it; if not, a new layer is created.
- **Paste Rename:** When a component that contains a text input parameter with symbol name Name is copied, this text can now be given a new name, based on the original seed text. For example, a component with a Name parameter with value *MyComponent* can be automatically renamed to *MyComponent_1*. This is especially useful when copying data labels, node labels and xnodes. To make use of paste rename, right-click and select *Paste | Paste Rename* on paste of a copied component.
- **High-Resolution Bitmaps:** Copying of schematic canvas components now produces a high-resolution bitmap image, which when pasted into other applications, maintains a high image quality.
- **Video:** *Copy Paste Feature* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.

Multiple Language Support in Sticky Notes

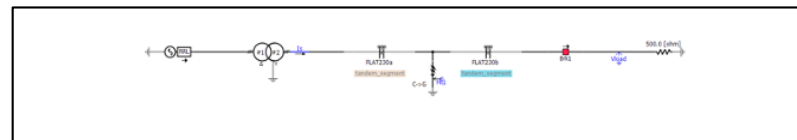
- The PSCAD V5 codebase has been updated to fully support Unicode, which enables users to use all known writing systems within sticky notes.
- This of course includes the Cyrillic alphabet and Chinese characters.
- This is a very important new feature, which has been passionately requested by many of our Asian and Russian users.
- **Video:** *Multi-language Sticky Notes* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.



Tandem Lines

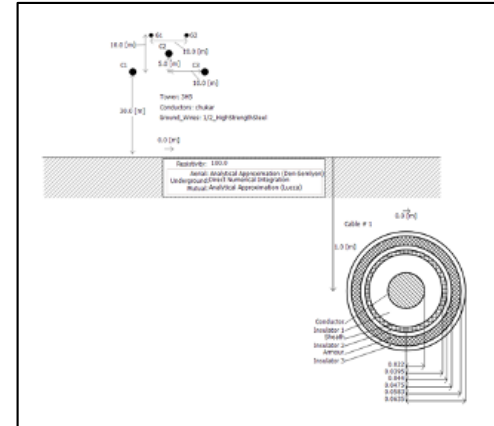
Sliding Faults

- With PSCAD V5, we introduce tandem line configuration (or Tandem Lines) for both underground cable and overhead transmission segments.
- This in response to numerous requests for an easier way to automate a sliding-fault style study.
- Using the basic, standalone multiple run control configured in the project settings Runtime tab, a tandem line simulation involves a pre-solve of all possible transmission segment lengths prior to launch.
- **Video:** *Tandem Lines and Cables* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.



Overhead/Underground Transmission Systems

- The underground cable transmission segment editor and line constants program (LCP) have been modified to allow the combination of overhead transmission tower and underground cable cross-sections, within the same right-of-way.
- The additional formula in the LCP takes care of the mutual impedance between aerial and underground lines.
- For specific help on this feature, contact the *Support Desk* (support@mhi.ca)



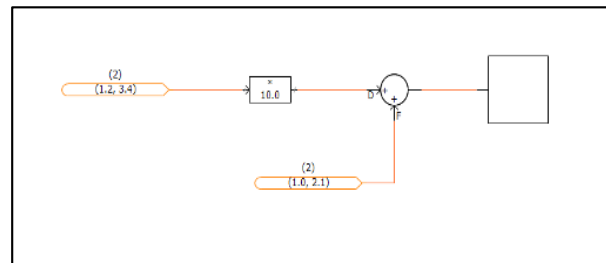
COMPLEX Signal Type

Complex-type signal variables, in addition to Real, Integer and Logical-types, are now supported in PSCAD V5.

Support for #LOCAL-type, complex declarations in component definition script was introduced in v4.6 but did not include the creation and support of actual complex-type data signals.

V5 includes the following enhancements to provide full support:

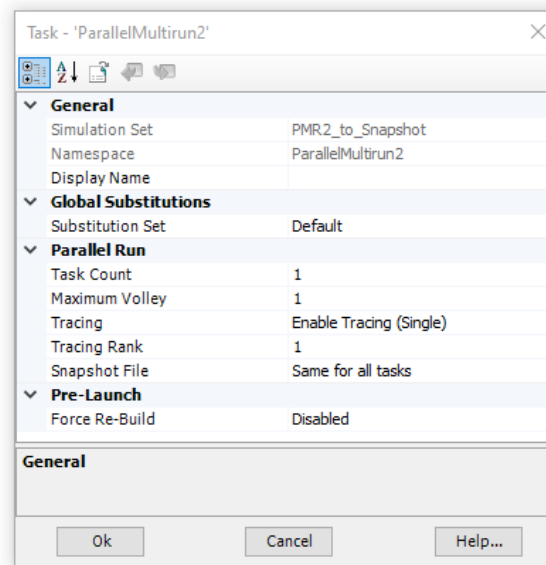
- A Complex data type option in component graphics port objects.
- A Complex parameter-type for both module and non-module components.
- Miscellaneous new and updated master library components, including a Complex constant tag. Also Complex signal support in many CSMF components.
- New **orange** colour represents Complex signal wires.



High Performance Computing

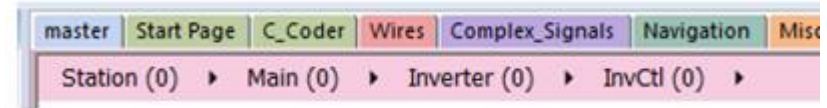
The utilization of high-performance and parallel processing functionalities requires multiple processor cores – the number of which may exceed those available locally on a typical workstation.

- **Cluster Launch System:** Running processes across multiple computers requires additional software to manage the simulation processes.
- **Parallel Multiple Run (PMR):** Added some additional properties to give the user more control over their PMR.
- **Multiple Plotted Data Sets:** If the user chooses to enable tracing (passing plot data back to PSCAD for viewing) on all parallel tasks, a convenient list of data sets will appear under the simulation.
- **Application Help:** Fully documented.
- **High Performance Computing Focused Webinar to be Broadcast:** [February 24, 2021](#)



Enhanced Project Navigation

- **Navigation Bar:** The schematic canvas pane possesses its own navigation bar, which includes 'breadcrumb' links
- **Bookmark Component:** Bookmarks are a special type of a component that provides a clickable hyperlink to a xy-coordinate on a specific schematic canvas within a project.
- **Bookmarks Pane:** Bookmarks may be managed from within the *Bookmarks* pane.
- **Hyperlink Component:** Hyperlinks are special components that may be used to set a URL to a specific webpage, for easy access to information related to the current study, for example.
- **Video:** *Navigation Feature & Bookmarks Feature* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.



 [Main \(1493,1147\)](#)

 [mod1 \(247,210\)](#)

 [mod2 \(559,355\)](#)

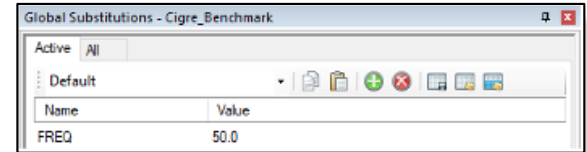


 [My Company Website](#)

Global Substitutions

New and Enhanced Design

- A new global substitutions pane, which provides a central area to edit, add and delete all global substitutions related to a single project.
- Inclusion of alternate global substitution values (or sets of values) when running the project as a task, in the context of one or more simulation sets.
- Global substitution sets may be associated with specific simulation sets.
- Store, append and replace global substitutions to/from file in *.cvs format.
- Set the min/max limits of slider components.
- **Video:** *Global Substitutions* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.

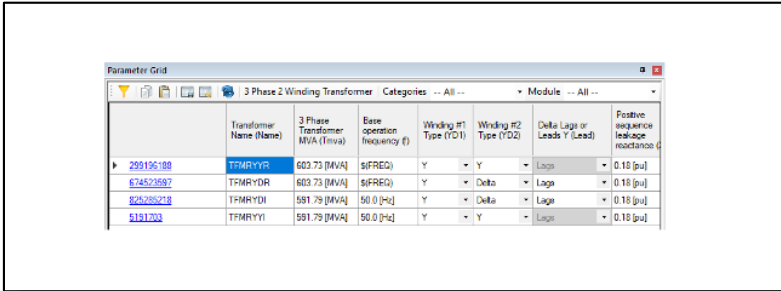


New and Improved Parameter Grid

The immensely popular parameter grid feature has been completely re-architected in PSCAD V5, specifically to address the user-identified shortcomings of its predecessor in v4.6.

- Support for buses, transmission lines, simulation sets, file reference components and sticky notes - virtually all schematic objects.
- Results may be filtered by parameter category page, in addition to page module.
- Disabled parameters (instance-based) are now displayed as such in the parameter grid results.
- Store, append and replace parameter grid results to/from file in *.csvs format.
- Parameter grid results may be transferred directly to a spreadsheet, modified and then transferred back via copy/paste.

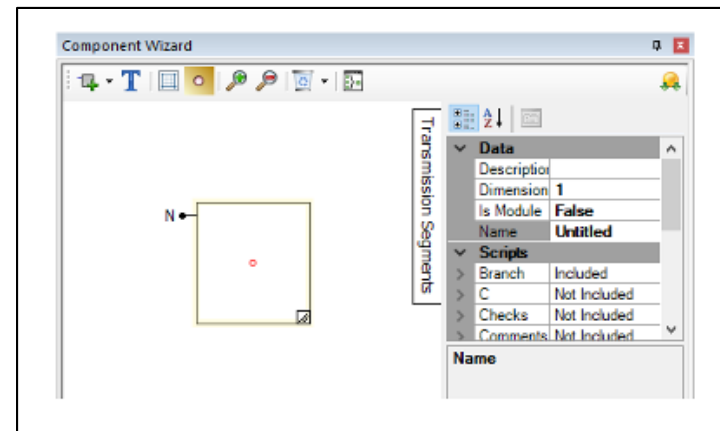
- Full undo/redo support.
- **Video:** *Parameter Grid* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.



Enhanced Component Wizard Design

PSCAD V5 includes a completely new and refactored component wizard, our best and most powerful iteration yet.

- Fully sizeable box graphic.
- Flexible port connection placement: Once a port is added, it can be moved around the box graphic to the desired position.
- Quick access property view.
- All component definition script segments may be optionally added at the time of creation.
- Automatic creation of a dummy language interface to either FORTRAN, C or MATLAB, upon creation of the Fortran, Dsdyn and/or Dsout segments.
- **Video:** *Component Wizard* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.



Simulation Sets

Functionality Improvements

Simulation sets were introduced in PSCAD v4.5 in order to facilitate the launching of parallel simulations. They have been continuously enhanced in each version since, and V5 is no exception:

- Project Settings and Layer Override
- Global Substitutions Set Select
- Enable/Disable Set
- Parameter Grid Support
- New Parallel Run Options
- **Video:** *Simulation Sets* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.

Snapshots	
Override Timed Snapshot(s)	Override
Override Snapshot File	Override
Override Time	Override

Layers	
MEDICY	Enabled
ALMU	Disabled
MEDS	Not Set
MAHD	Not Set


Parameter Grid						
Simulation Set Settings Categories -- All --						
	Name (name)	Enab (enal)	Post-Run Process (after_run)	Wait (Post (after)	Pre-Run Process (before_run)	Wait (Pre- (before)
▶	1778164673 Snapshot	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
	539291880 Impedance_20	<input checked="" type="checkbox"/>	'run_1.bat' *Proj...	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
	850367812 Snapshot_40	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
	1863594381 Impedance_40	<input checked="" type="checkbox"/>	'run_1.bat' *Proj...	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>









































Layers

Custom Layers

- Users can now customize layers to function as templates for various run configurations.
- **Video:** *Layers Feature* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.

Layers (Cigre_Benchmark - MyStudy)

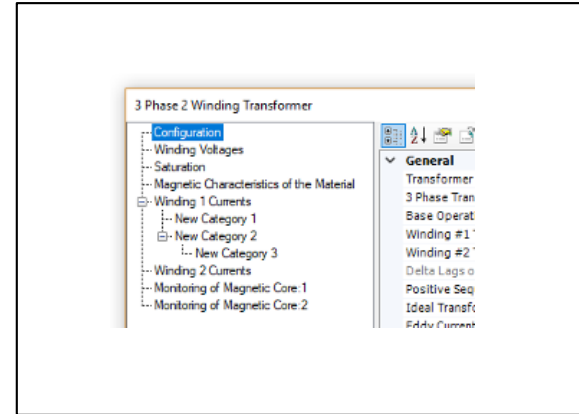
MySettings 

Component Ids	Enabled	Disabled	Invisible	MySettings
1768942237	Enabled 	Disabled 	Invisible 	Enabled 
1952515185	Enabled 	Disabled 	Invisible 	Enabled 
1261338218	Enabled 	Disabled 	Invisible 	Enabled 
513361202	Enabled 	Disabled 	Invisible 	Enabled 
553753660	Enabled 	Disabled 	Invisible 	Enabled 
1426647337	Enabled 	Disabled 	Invisible 	Disabled 
328280408	Enabled 	Disabled 	Invisible 	Disabled 
14561079	Enabled 	Disabled 	Invisible 	Enabled 
835565295	Enabled 	Disabled 	Invisible 	Enabled 
749338860	Enabled 	Disabled 	Invisible 	Enabled 

Enhanced Component Parameter Dialogs

In an effort to provide a more efficient means of organizing very large amounts of component input and output parameter data, the component parameter dialog has been greatly improved for the V5 release.

- **Tree-Based Category Window:** The flat, drop-list category page format, which has been a part of PSCAD since the V2 days of the 1990s, has been replaced by a multi-level, tree-based category window. The new tree style can be extended to provide multiple branch levels (branches within branches), to provide a second dimension to the organization of categories.
- **Dynamic Help:** A Java-based, dynamic display and feedback window, called the *Dynamic Help Pane*.
- **Video:** *New Property Dialog* (see <https://www.youtube.com/user/PSCAD1>)
- **Application Help:** Fully documented.





PSCAD V5

Feature Demos



THANK YOU!



QUESTIONS?

John Nordstrom – support@mhi.ca

Subject: PSCAD V5 WEBINAR