



HEEDS | mdo

2015.11 What's New



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Overview

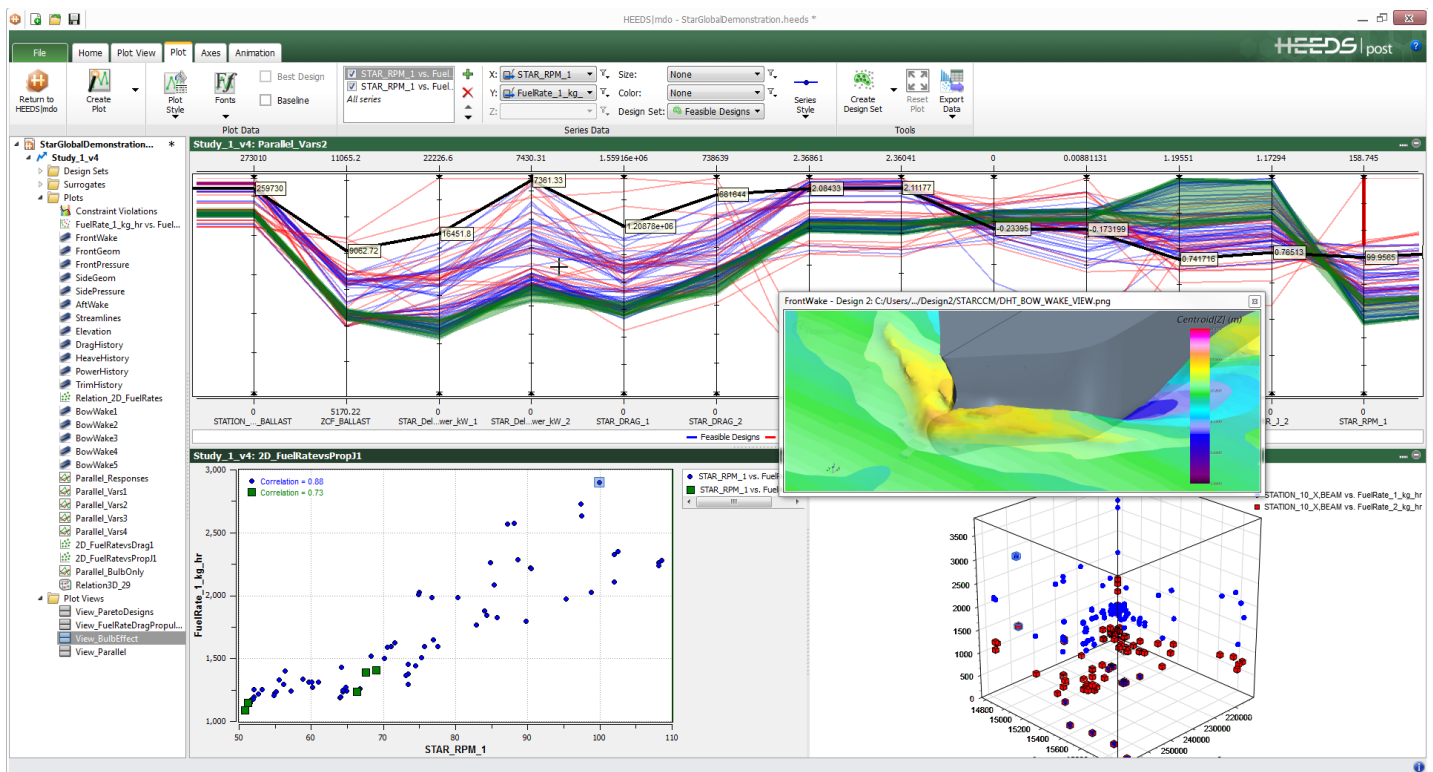
Red Cedar Technology provides powerful tools for quickly and easily exploring product design options to find the best possible design to meet your needs. HEEDS 2015.11 continues to streamline design exploration through improved results processing and automated analysis tools.

In this document, you will find information on new capabilities and workflows along with enhancements to existing features. These are separated into the follow key areas:

- Process Automation
- Results Processing
- Portals

Any known issues are documented at the end of these notes.

For more detail on utilizing specific capabilities, please refer to the online help.



Process Automation

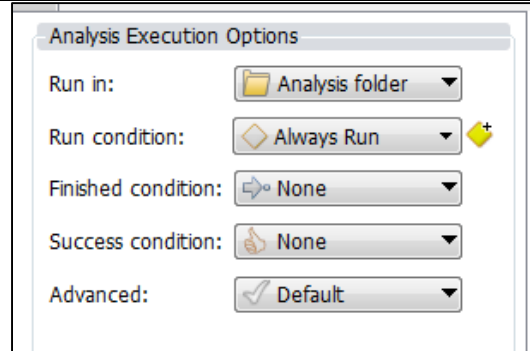
Analysis Execution Conditions

DESCRIPTION:

Previously in HEEDS, you had the ability to use conditions to determine if an analysis should run. This capability has been extended to now support completion conditions for determining not only if an analysis completed, but also if it completed successfully.

BENEFIT:

This provides more precise monitoring and determination on the completion state of an analysis leading to more robust solution logic and less manual intervention.



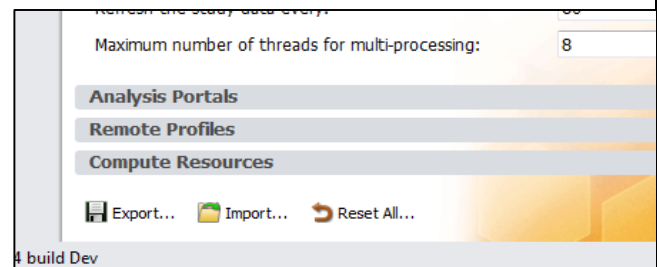
Import/Export Settings

DESCRIPTION:

To aid in configuring workstations, HEEDS now supports the ability to Import and Export the program option settings. This also includes plot defaults. Configure one machine and then apply those settings to any other machine in the organization.

BENEFIT:

This dramatically reduces the time for specifying CAD, CAE, and solution settings by eliminating duplication of effort as well as minimizing potential errors in defining settings.



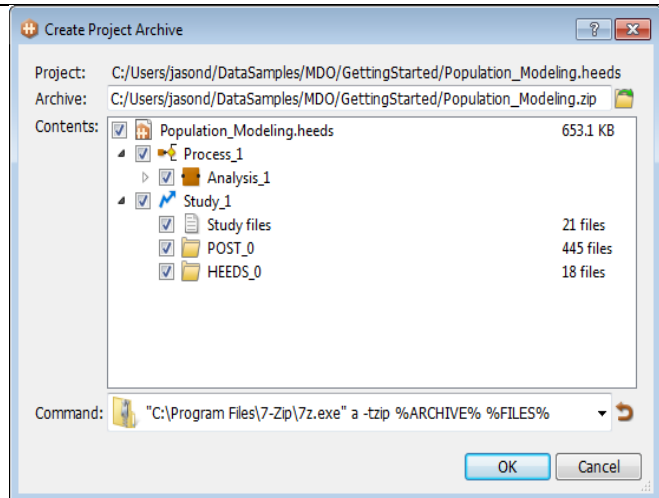
Project Archiving

DESCRIPTION:

HEEDS 2015.11 now supports the ability to archive a project including all the input files needed to run a study.

BENEFIT:

This streamlines the process of sharing projects with others, but also backing up with everything needed to run the studies.



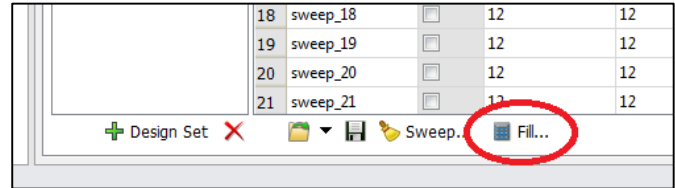
Auto Fill Design Sets

DESCRIPTION:

To aid in populating random design samples or filling in design points about existing data, HEEDS now offers the ability to add additional design sets using Optimal Latin Hypercube algorithm.

BENEFIT:

This improves the uniformity of random sample distributions to ensure efficient yet thorough design space sampling for better surrogate models.



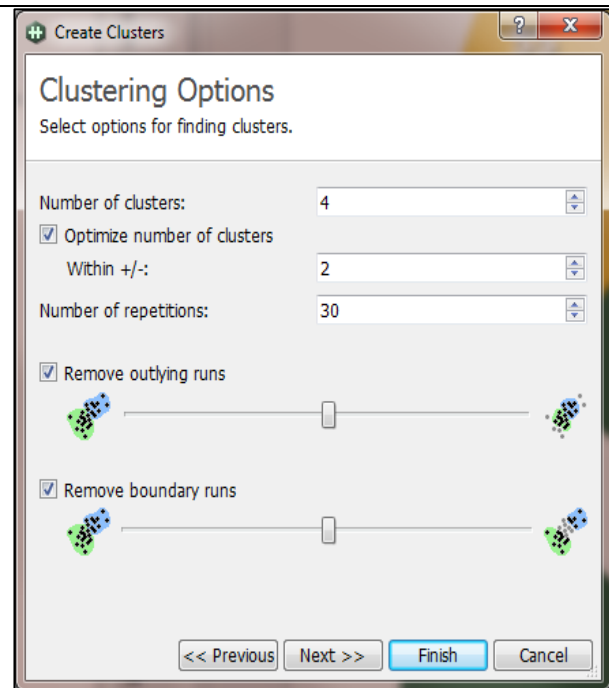
Cluster settings

DESCRIPTION:

Previously, identification of result clusters was a manual process. In HEEDS version 2015.11, you now have the option of optimizing the number of clusters as well as the degree to which outlying or boundary runs are excluded.

BENEFIT:

This additional level of control ensures that you are identifying the most well defined design groups from the runs for further investigation.



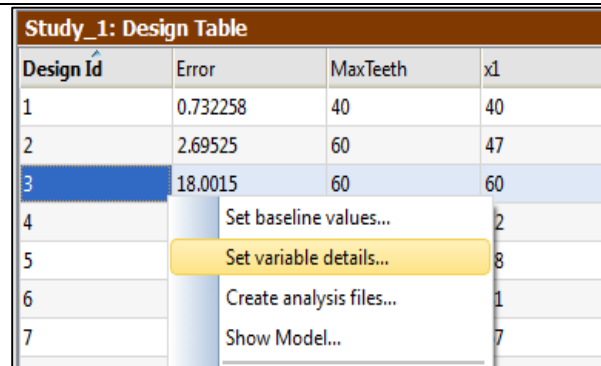
Set Variable Details

DESCRIPTION:

Using the new **Set Variable Details** tool, you can easily create a follow up study that focuses on an interesting design or design area.

BENEFIT:

This allows you to quickly setup and run a DOE or a robustness and reliability study around a specific design point or simply set up a new study based on the definitions of an existing study.



Simplified analysis settings

DESCRIPTION:

The analysis execution options have been consolidated into a simpler interface on the execution tab where advanced options are available from pull-down menus.

BENEFIT:

This streamlines the interface and is easier to interact with as advanced settings are not cluttering the display or on multiple tabs. But, all options are still readily accessible if changes are needed.

Analysis Execution Options

Run in:  Analysis folder ▼Run condition:  Always Run ▼ Finished condition:  None ▼Success condition:  None ▼Advanced:  Default ▼

Analysis pre/post command support

DESCRIPTION:

You can now use this extended capability to specify actions to perform before or after an analysis execution. For example, you can easily specify license check actions, delete rogue processes, archive/delete large files, etc.

BENEFIT:

This provides more thorough study actions without complicating the analysis execution.

Advanced Options


Max execution time: 360000 seconds

Job name prefix: Shared project path:

Execution shell (Linux): /bin/bash

☒ Capture analysis output

Optional command to run prior to the analysis tool

  ☐ Check return value: 0

Optional command to run immediately after the analysis tool

  ☐ Check return value: 0

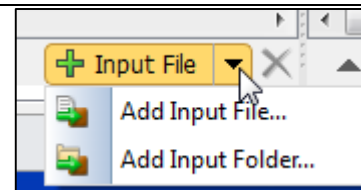
Folders as inputs

DESCRIPTION:

In addition to individual files, complete folder structures can now be specified as inputs for an analysis object.

BENEFIT:

This simplifies setup and automation of tools with rigid folder hierarchies.



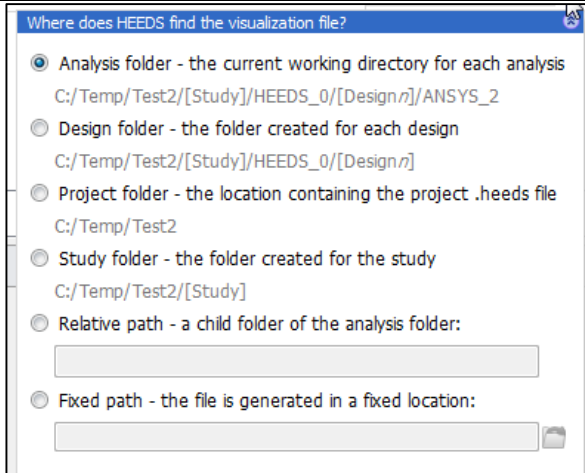
Visualization file locations

DESCRIPTION:

Result visualization file locations can now be individually specified in a similar manner to the source properties of output files.

BENEFIT:

Easily add files that are not generated directly in the analysis folder. This provides greater flexibility for various analysis tools.



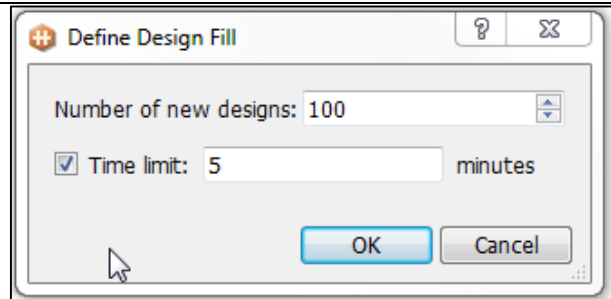
Time limit for Optimal LHC

DESCRIPTION:

When generating population samples with the Optimal Latin Hypercube algorithm, you now have the ability to specify a time limit for the Design Set Generation.

BENEFIT:

This allows you to use OLHC for problems where the full optimization previously may take a prohibitively long time for high dimension or large data models.



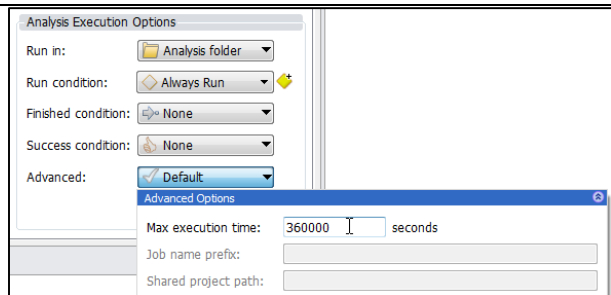
Max time in serial mode

DESCRIPTION:

Previously a max computation time was only available for parallel runs. This is now supported for serial runs. The analysis processes are stopped when the specified time is exceeded.

BENEFIT:

Makes it easy to handle outlier situations where an analysis tool may get stuck, essentially pausing the study.



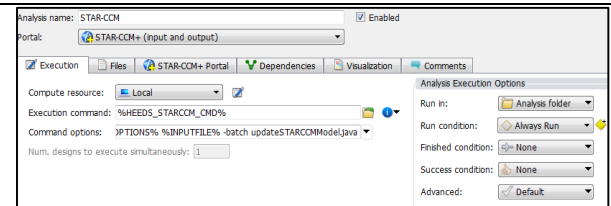
Improved analysis execution

DESCRIPTION:

The process for executing background analysis runs is now the same for both parallel and serial workflows. There is no longer a need to develop special execution scripts to run analyses in parallel.

BENEFIT:

This provides a consistent job submission and simplifies the analysis execution setup.



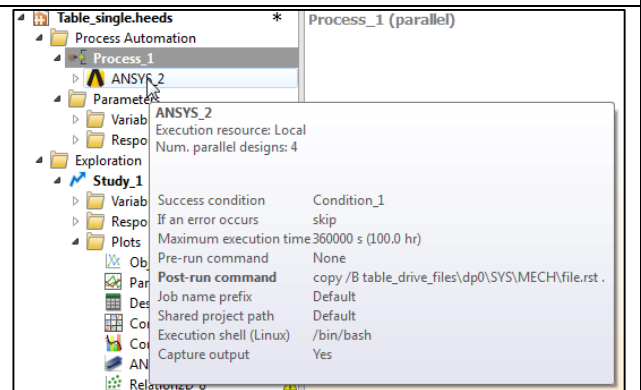
Analysis Tooltips

DESCRIPTION:

Hovering over an analysis in the tree provides a tooltip with a summary of the settings. Any settings that are not defaults are shown in bold.

BENEFIT:

This provides a quick and convenient way to check the settings for multiple analyses and avoid having to sequentially open each one to confirm the properties.



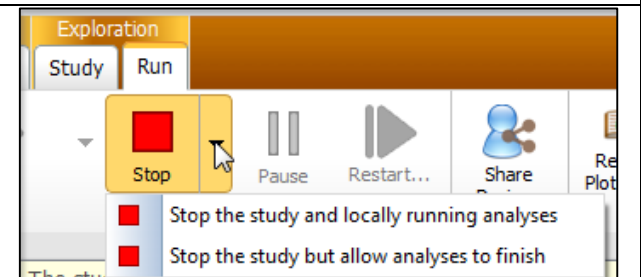
Run abort control

DESCRIPTION:

When you need to abort a study, there is now an option to stop the study and allow the analyses to continue running through the current evaluation. By default, all running analyses are aborted when the study is stopped.

BENEFIT:

This provides additional flexibility and is especially helpful for analyses that take a long time to run and the current evaluation is useful for further study.



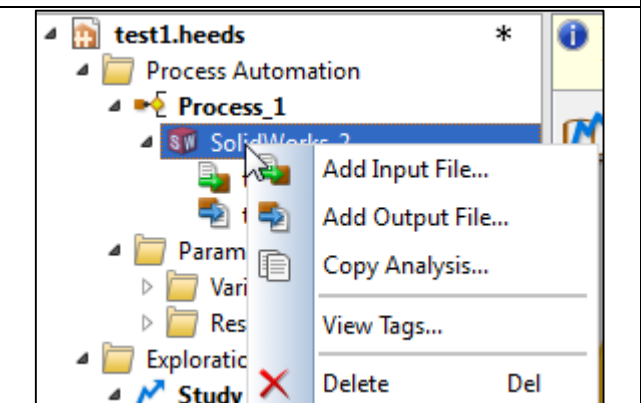
Analysis Duplication

DESCRIPTION:

Reusing existing analysis configurations has been made easier in HEEDS version 2015.11. You can now copy an analysis from the contextual menu.

BENEFIT:

This provides convenient access to taking existing analysis configurations to utilize in other runs. This significantly reduces study setup time.



Progress Indicator

DESCRIPTION:

Additional feedback is now displayed for tasks that can take a long time to complete. Kriging auto tuning, surrogate cross-validation, optimal Latin hypercube, and clustering statistics now show progress monitors

BENEFIT:

This ensures you have a good estimate about how long it will take until completion.

LHC optimization

4%

Cancel

Save restart data after each evaluation ☒

Do not stop HEEDS for a design-b ☐

Random seed: 0.1

STATION_10_X	STATION_5_X	STATION_4_X_Fract	E_MID_BODY_RA
60	113000	0.705376	3609

Results Processing

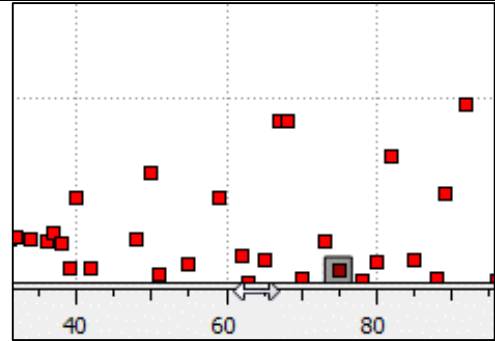
Plot axis pan

DESCRIPTION:

The vertical and horizontal axes can now be panned using a left mouse drag or mouse wheel operation in HEEDS 2015.11. Hovering over an axis now shows a back/forth direction icon indicating that you can pan across the plot.

BENEFIT:

This allows for easy manipulation of the focus when zoomed in or for Parallel plot with lots of parameters.



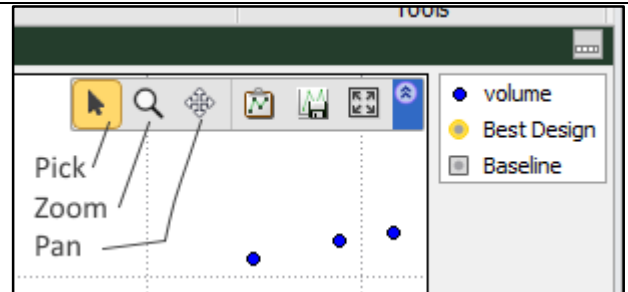
Plot toolbar

DESCRIPTION:

An expandable toolbar has now been added to plot windows to access Pick, Zoom, Pan, Copy, Save and Reset commands.

BENEFIT:

This reduces the time to customize plots by enabling faster access to plot tools and is more discoverable for new users that are unfamiliar with the shortcut keys/methods.



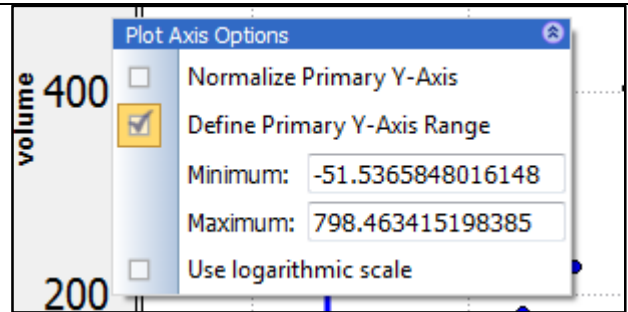
Plot Property modification

DESCRIPTION:

Specific plot properties are now available by directly double clicking on the following regions on the plot: Axis, Background (Plot display), and Design Data.

BENEFIT:

This provides faster access to the specific plot settings you want to modify, reducing the number of steps to customize a plot.



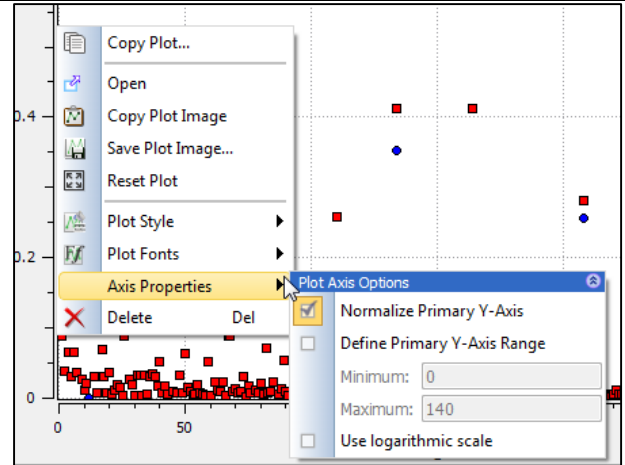
Plot contextual menu

DESCRIPTION:

An additional method of providing direct access to plot customization is through the contextual menus. You now have convenient access to modify style, fonts, and axis properties with a simple right-mouse button.

BENEFIT:

This reduces mouse travel as well as the number of steps to modify plots, which greatly speeds up the customization process.



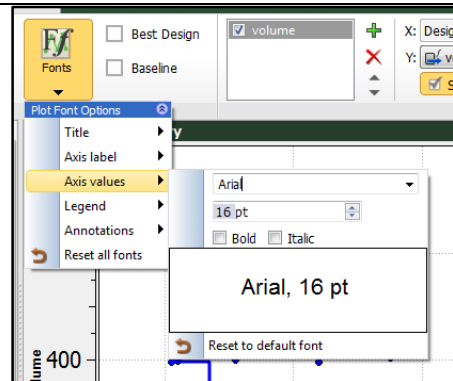
Plot specific fonts

DESCRIPTION:

Plots can now have independent font settings to override the default global font.

BENEFIT:

This provides added flexibility in tailoring the look and feel of each plot-type to suit your specific needs.



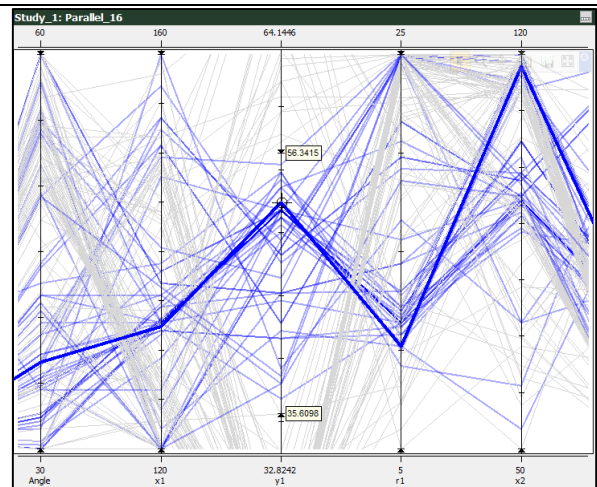
Parallel parameter scale

DESCRIPTION:

Parallel plots now offer the ability to independently adjust the vertical axis scale for any parameter as well as dynamically filter the range of the parameter.

BENEFIT:

This enables you to focus on key areas of interest with greater fidelity and more readily identify patterns in data or perform tradeoffs.



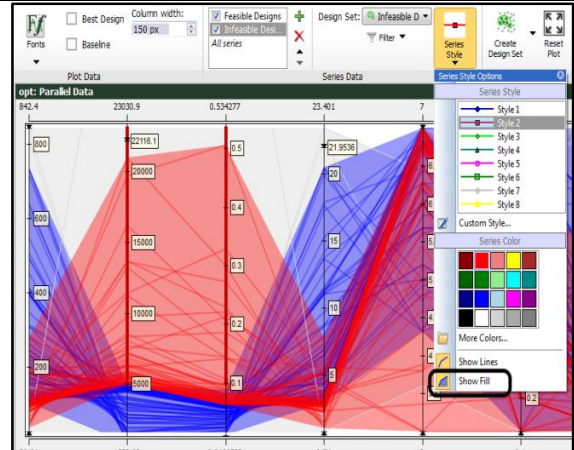
Parallel plot design set fill

DESCRIPTION:

A new **Shade Fill** plot style is now available providing the ability to shade plot domains for specific design sets.

BENEFIT:

This provides a clearer visual display on parameter/variable ranges associated with design sets to highlight go/no go areas.



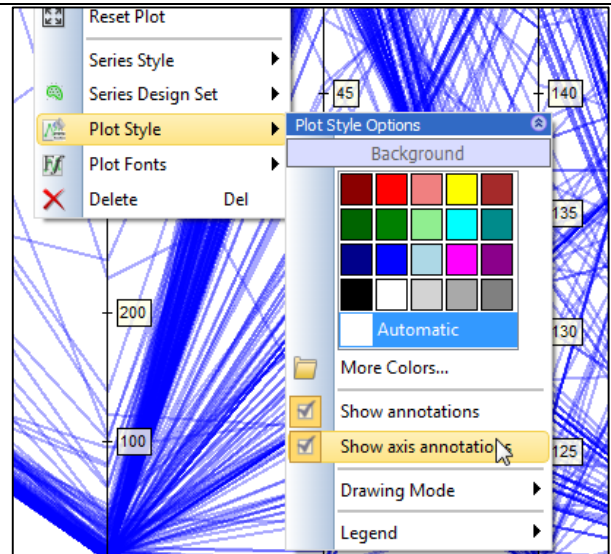
Parallel plot annotations

DESCRIPTION:

Additional annotation options are now also available for parallel plots. Both axis-specific and general filter range annotation display can be toggled for each plot.

BENEFIT:

This allows for easy identification of parameter/variable values and current filter settings.



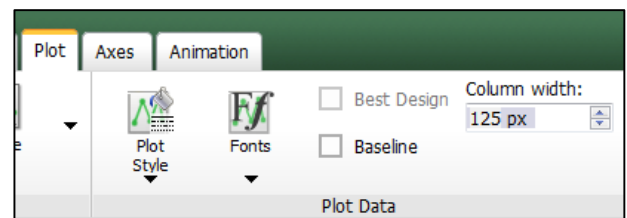
Parallel plot column width

DESCRIPTION:

You now have the ability to specify the column width for parallel plots. This can be defined to fit all columns to the window at the lowest setting up to 200 pixels per column. The minimum column width is specified in the HEEDS options.

BENEFIT:

Used in conjunction with the new axis pan capability, you can now avoid cluttered plots to ensure ease in interrogating results.



Parallel plot default column range

DESCRIPTION:

By default, the data range for each column in a parallel plot is just the range of the plotted data. Now in HEEDS version 2015.11, under the options section, a user can adjust the default range of design variables to reflect the study min/max values. Also, the user can set the default range of the response output to be for all the design data, rather than just the range of the plotted data.

BENEFIT:

The new options allow you to see the plotted data in the context of the entire study and to identify regions on the design space that are not explored.

Parallel plot:

Inactive designs: ☒ Draw in grey ☐ Hide ?
 Initial quality: ☒ Quick ☐ High quality ?
 Minimum column width: 150 px
 Response column range: ☐ Plotted data ☒ All design data
 Variable column range: ☐ Plotted data ☒ Study min/max
 Transparency of plot lines: 70 %

Parallel Plot View manipulation

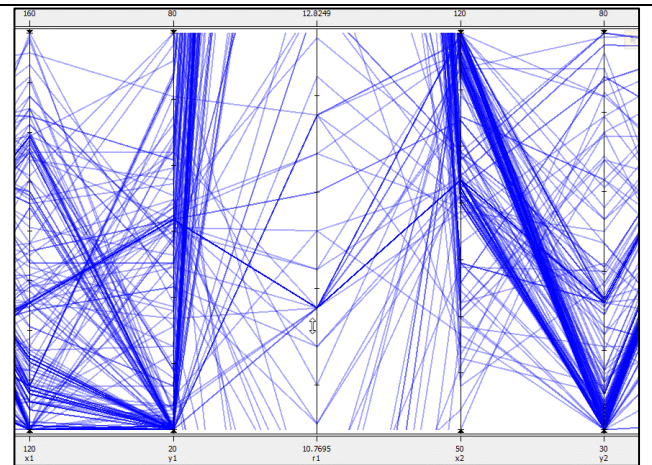
DESCRIPTION:

For more consistent interaction, parallel plots now support pan and zoom capabilities. For individual columns, the mouse wheel now zooms in/out (defaults to nearest column to mouse).

Pressing the Alt key and dragging the mouse allows for panning. If a column is zoomed in, this includes up and down panning for that specific column. If the columns do not fit to the plot screen, this includes left/right panning for the entire plot.

BENEFIT:

This provides a more consistent and easy interaction with plots when focused on subsets of the data.



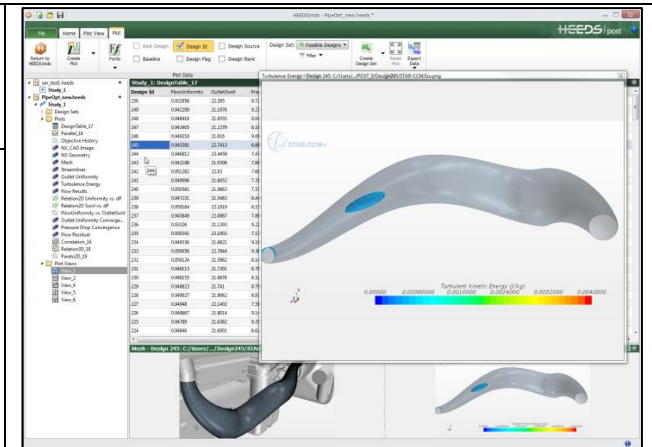
Open plot in separate window

DESCRIPTION:

A new capability in version 2015.11 is the support to open any plot in a separate window. This window can be resized or moved outside of the application window.

BENEFIT:

This enhances plot comparisons as well as exporting images of a desired size.



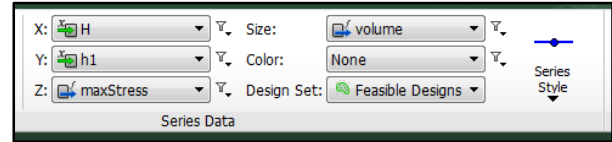
Consistent plot properties

DESCRIPTION:

Plot properties are now consistent for History, 2D Relation, 3D Relation, 2D Pareto, and the new 3D Pareto plots to define the X, Y, Z, size, and color series properties.

BENEFIT:

This provides common settings and extends great flexibility into all plot types.



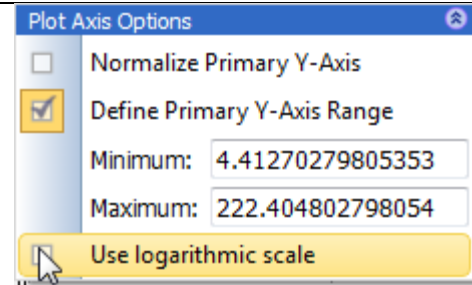
Plot axis logarithmic scale

DESCRIPTION:

A great new capability for more easily displaying results that vary widely is the support for logarithmic scale on the axes of History, 2D Relation, and 2D Pareto plots.

BENEFIT:

This make interaction with specific design points easier and result trends clearer.



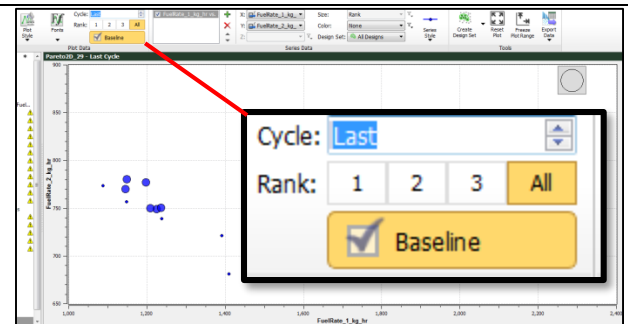
Pareto plot display control

DESCRIPTION:

In Pareto plots, you now have the ability to choose between 'All', 'Last', or a specific cycle. You can also include the baseline design point for reference.

BENEFIT:

This adds improved ways of visualizing the optimal design set relative to the original concept as well as the progression over time.



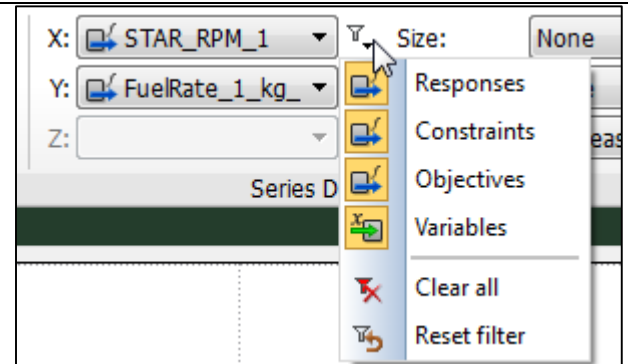
Plot object filters

DESCRIPTION:

Filters have been added to plot selection fields so that only specific object types are listed.

BENEFIT:

This speeds up selection options and allows for a greater level of customization to get the exact plot you that you desire.



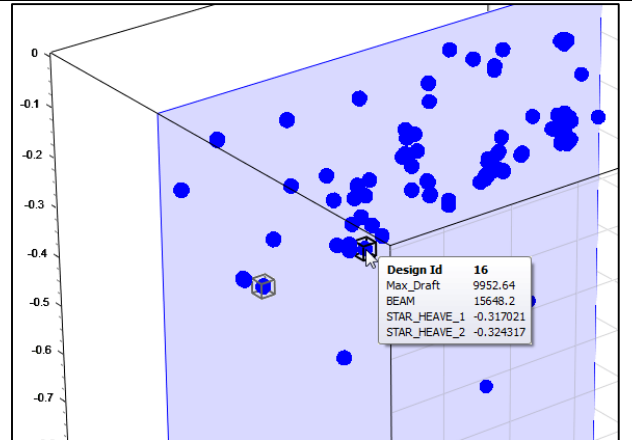
3D Plots

DESCRIPTION:

3D Plots are now more interactive with similar options to other plot types such as the ability to pan as well as zoom/rotate. You can probe results to identify design point details.

BENEFIT:

This provides increased insight and consistent means of interacting with different plots.



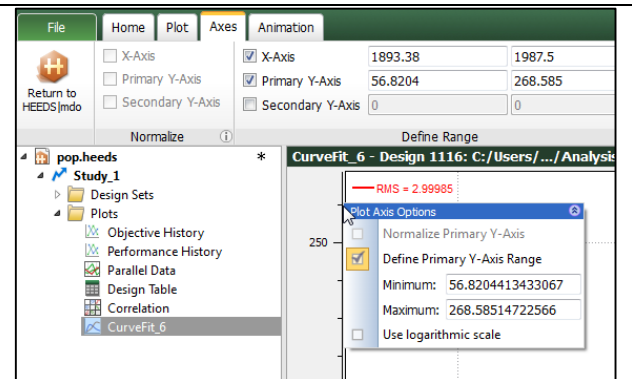
Curve fit plot

DESCRIPTION:

The curve-fitting plot now includes the plot axes tab for configuring the scale and axis display. This also includes the contextual editing options and the ability to pan on the axis directly.

BENEFIT:

This provides more control over the display of curve fitting results to suit your output needs.



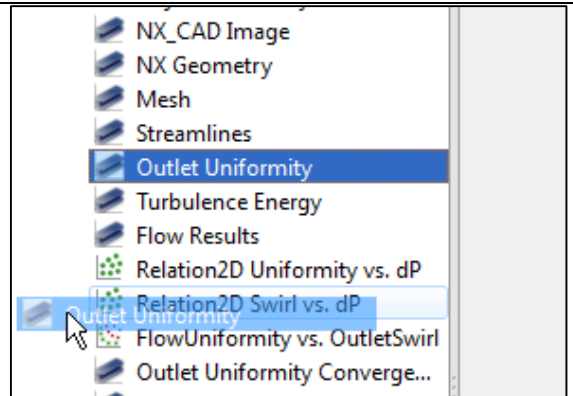
Tree interface drag and drop

DESCRIPTION:

Tree items can now be manually ordered using simple drag and drop. This applies to aspects such as variables, response, and plots.

BENEFIT:

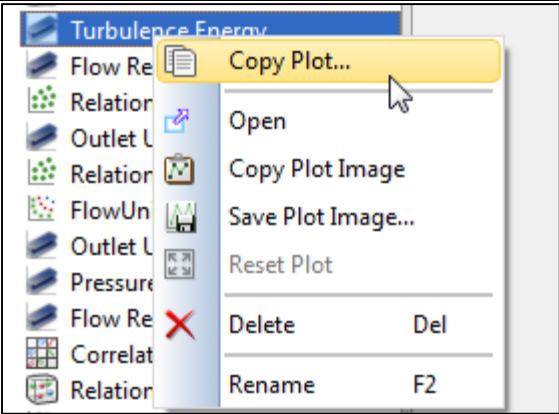
This provides the ability to tailor the order of items to suit your needs in an easy and intuitive fashion.



Plot copy

DESCRIPTION:
Plots can now be copied using the contextual menu.

BENEFIT:
This provides a more efficient and convenient way of utilizing existing plot configurations for new plots and avoids recreating plots from scratch.



Portals

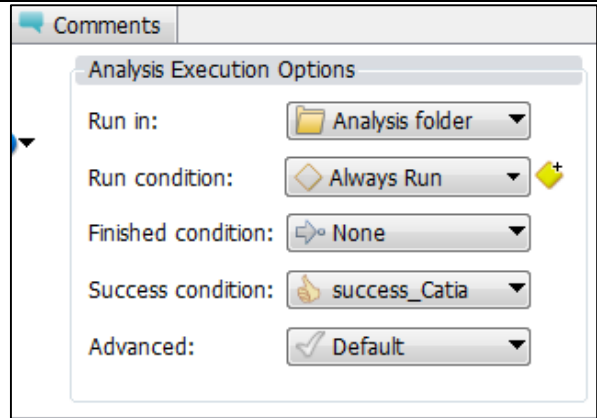
CATIA

DESCRIPTION:

The management of HEEDS-launched and user-launched CATIA sessions have been streamlined. The portal now also checks for successful updates to the CAD model by default.

BENEFIT:

This streamlines project setup saving time and effort.



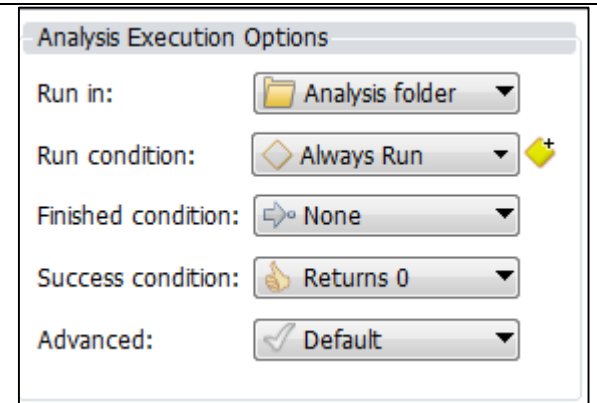
Creo Parametric

DESCRIPTION:

Creo error-handling has been greatly improved. Internal second regeneration errors are now captured and handled. The portal now also checks for successful updates to the CAD model by default.

BENEFIT:

This results in fewer regeneration errors for runs and improved usability.



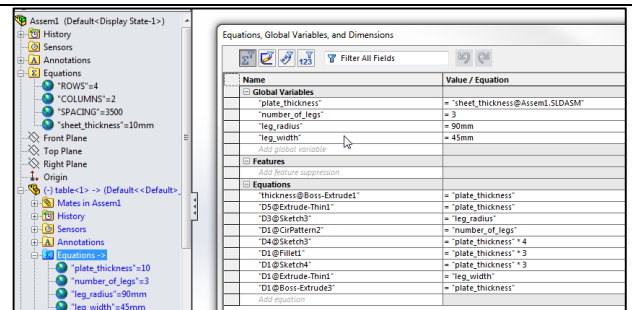
SOLIDWORKS

DESCRIPTION:

Equation updates are now supported for more scenarios. If component equations exist, they are retained in the updated SolidWorks model.

BENEFIT:

This delivers increased robustness for handling parametric changes in more models.



NX CAD

DESCRIPTION:

The NX CAD portal now handles long equations. The equation length limit was increased from 256 to 4096 characters.

BENEFIT:

This provides more flexibility to handle complex parametric relations in the design.

Parameter	Value	Unit	Num...	✓
Gap (SKETCH_000:Sketch(1) ...	10	mm	Num...	✓
hub_depth (SKETCH_000:Sk...	75	mm	Num...	✓
hub_radius (SKETCH_000:Sk...	125	mm	Num...	✓
Hub_thickness	7.5	mm	Num...	✓
p27	7.5	mm	Num...	✓
Rotor_radius (SKETCH_000:S...	230	mm	Num...	✓
Rotor_thickness (SKETCH_0...	15	mm	Num...	✓

Type: Number Length

Name: Gap mm

Formula: $\text{hub_radius}^2 * 0.1234456 + \sin(\text{Hub_thickness} * 90 * \pi / 180) + \log_{10}(\text{hu})$

Buttons: OK Apply Cancel

JMAG

DESCRIPTION:

Auto tagging with JMAG has been enhanced; Tag names are now always unique and Japanese characters are supported. The portal now also supports macro usage with JMAG analyses and automatic generation of visualization files from JMAG models.

BENEFIT:

This minimizes the user interaction needed for setting up and executing studies.

Execution Files JMAG Portal Dependencies Visualization Comments

JMAG model: my_model

JMAG study: my_study

Enter the names of the JMAG macros to execute for each evaluation (optional). Separate multiple macros with a semi-colon.

Before setting variable values: preMacro.vbs

After setting variable values: postMacro.vbs

☒ Run analysis

Type	Filename	Source
1 <input checked="" type="checkbox"/> Image file	JAC173IPM-Basic-02d-2.png	Analysis folder
2 <input checked="" type="checkbox"/> Image file	mesh.png	Analysis folder
3 <input checked="" type="checkbox"/> Image file	contour.png	Analysis folder

Buttons: Add item X

Known Issues

VCollab

DESCRIPTION:

If using VCollab to visualize model plot over Remote Desktop, the display is not rendered properly and could even cause a crash.

WORKAROUND:

Set the following environment variables on the remote machine:

VCOLLAB_SKIP_OGL_DRIVER_CHECK=1

VCOLLAB_FORCE_OGL=1

Upgrading HEEDS Projects that use portals

DESCRIPTION:

Upgrading a HEEDS Project that uses an analysis file (tagged using the portal) with the wrong (unsupported in the latest version) extension will not import the tags properly during an upgrade.

WORKAROUND:

Since the CAE portals require specific file extensions, rename the analysis file to use a supported extension and then upgrade.

Adams Portal

DESCRIPTION:

Unable to set up a project using the Adams portal on a Linux machine.

WORKAROUND:

The **setup** for the Adams portal is only supported on Windows. Setup your HEEDS project on a Windows machine. Once the setup is complete, the project can be copied to the Linux machine for running the study there.

Installation on Linux

DESCRIPTION:

When installing HEEDS MDO on a Linux machine using X11 forwarding, some of the fields may appear disabled.

WORKAROUND:

Try a different X server or try using the mouse controls to cut, copy, and paste text into the relevant fields.

ANSYS Workbench on Windows

DESCRIPTION:

When running a HEEDS study using ANSYS WB from a project that was built in HEEDS MDO version 2015.04 or earlier, the end of the ANSYS analysis may not be detected even though the analysis is complete.

WORKAROUND:

Please refer to the ANSYS portal documentation in the HEEDS MDO User Manual for details about this issue and for workarounds.