HEEDS®

Discover Better Designs, *Faster*

2016.10 What's New

red cedar TECHNOLOGY
A Siemens Business

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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 2016.10 is packed with great enhancements that continue to streamline design exploration through improved results processing and automated analysis tools. One example is the ability to view analysis results in the process workflow shown below in Figure 1.

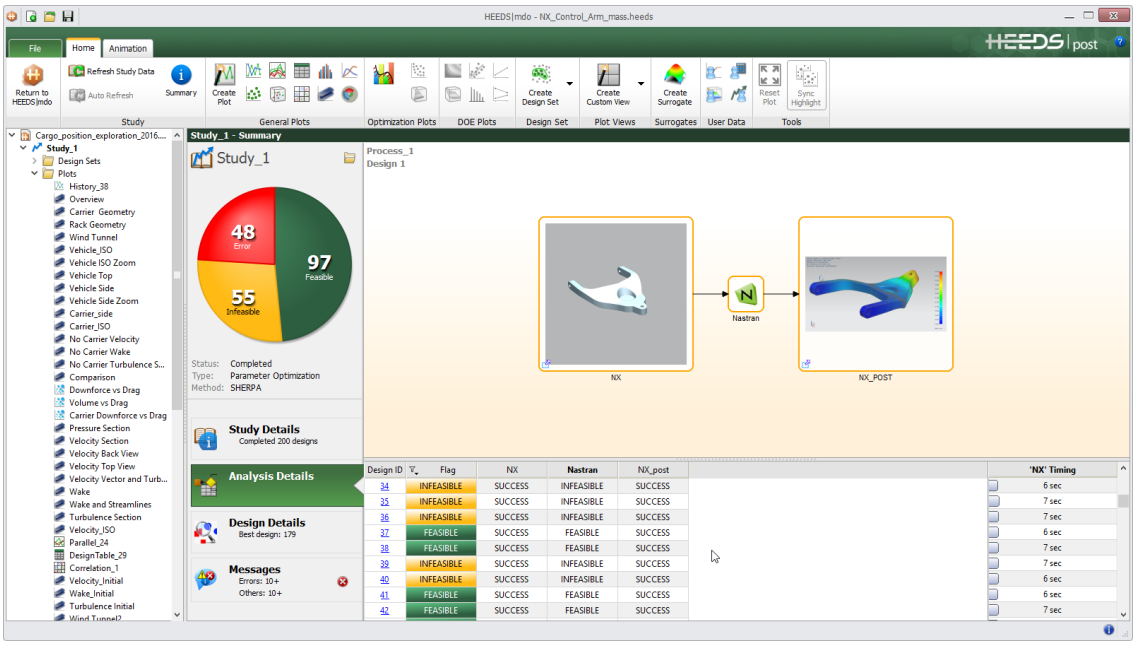


Figure1 Result images can now be displayed in the process workflow

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

- Process Automation
- Results Processing
- Portals

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

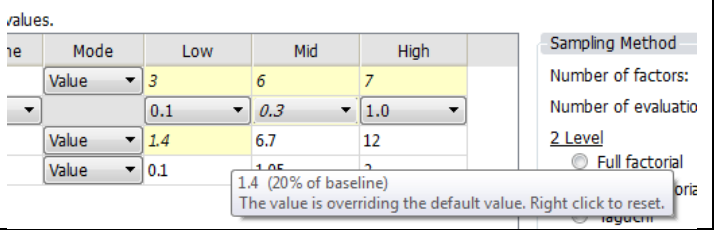
For more details on utilizing specific capabilities, please refer to the online help or contact the HEEDS support team (support@redcedartech.com). Visit the HEEDS website and subscribe to our newsletter for information on webinars, blog posts, product applications, customer case studies, and upcoming events.

Process Automation

DOE Modified Range Highlight

DESCRIPTION:
When default values are overridden in the DOE Methods tab, they are highlighted in yellow in the table interface. Values can be reset to default by right clicking on them.

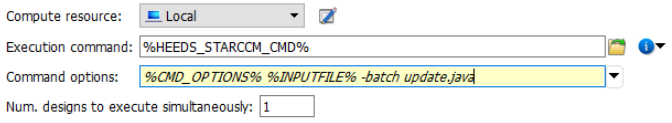
BENEFIT:
Ensures users are alerted to any changes deliberately or accidentally made to input ranges.



Modified Entry Highlight

DESCRIPTION:
Any entry fields that are now modified from the default have the background highlighted in yellow to provide more distinctive contrast. This includes the Solver, Command, and values in the user options analysis profiles and the min/max allowable response values. Analysis execution commands and options are also supported.

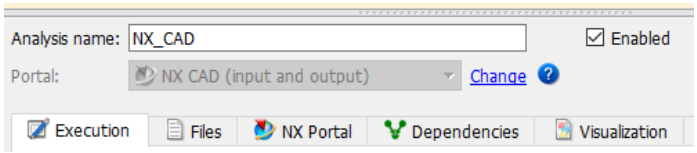
BENEFIT:
Changes are now highlighted consistently, throughout the user interface, with distinctive yellow visualization.



Portal Type Protections

DESCRIPTION:
To prevent specific portals from being accidentally changed in a process, the change feature has been modified to require an intentional 'Change' selection by the user. General, catalog, or user defined analysis types, can still be readily adjusted.

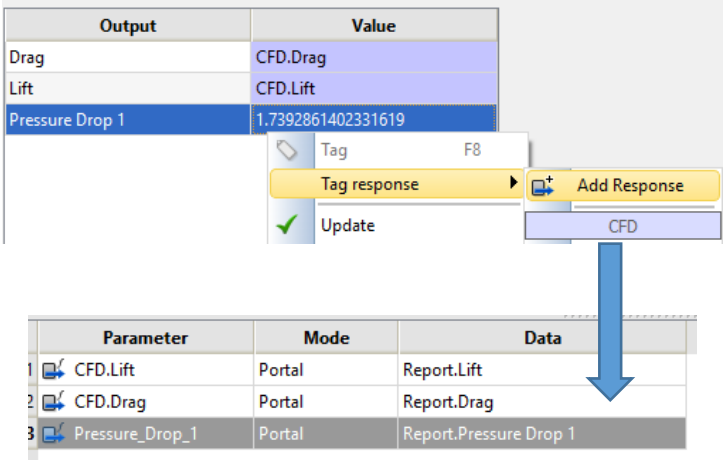
BENEFIT:
Ensures the portal type cannot be accidently changed, by mouse or keyboard interaction, since this change can result in the loss of portal defined data for the analysis.



Tagging New Parameter Defaults

DESCRIPTION:
When manually tagging parameters in an analysis file, it is common that the user adds new variables or responses. To assist in the process, when you create a new variable from the analysis file, the default name and baseline value are used from the data in the analysis file.

BENEFIT:
Intelligently adds new variable names and baseline values.



Extended Python Module Inclusion

DESCRIPTION:
Python users frequently use standard functions in NumPy, SciPy, matplotlib and IPython to easily do numerical processing. These are now included and supported in the Python Portal.
Please note that Linux support is limited; CentOS 5 is not supported and only NumPy and SciPy are supported on CentOS 6.

BENEFIT:
Extends available automation through the Python Portal.

SciPy.org

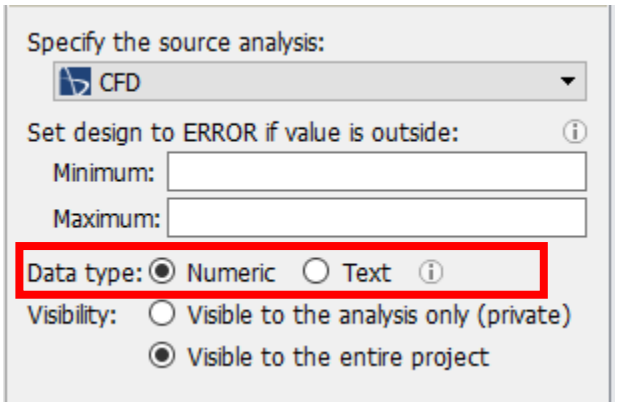
matplotlib

IP[y]: IPython
Interactive Computing

Response Parameter Format

DESCRIPTION:
Response parameters can now have their Data type defined as numeric or text format to aid in use for formulas and other operations such as plots.

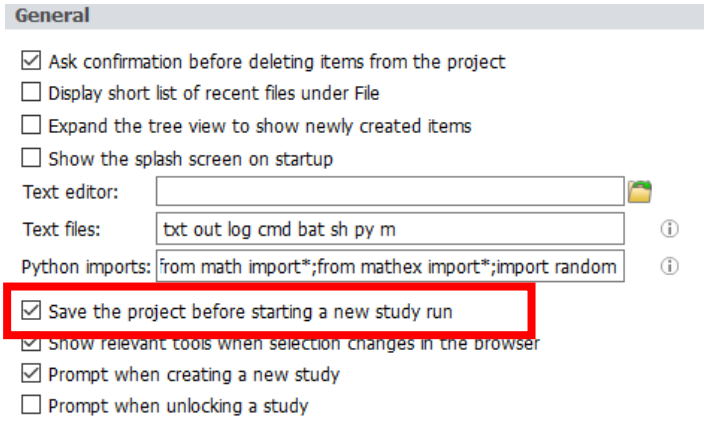
BENEFIT:
Improved user control over response format for further calculation usage.



Save Project Before Run

DESCRIPTION:
To ensure the saved project is synchronized with the current run, a new options setting has been added to automatically save the project prior to executing the run.

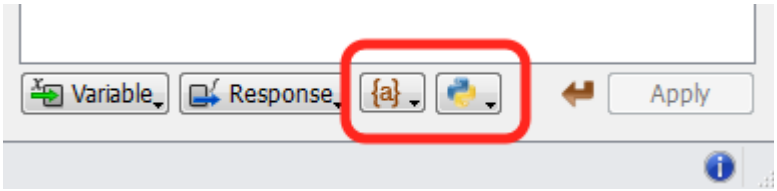
BENEFIT:
Ensures project settings and results are always consistent.



Discrete Set References in Formulas

DESCRIPTION:
Discrete Set and Curve objects can now be referenced in formulas for responses and dependent variables. These are available as 1D or 2D arrays. Note that these are not available in HEEDS POST.

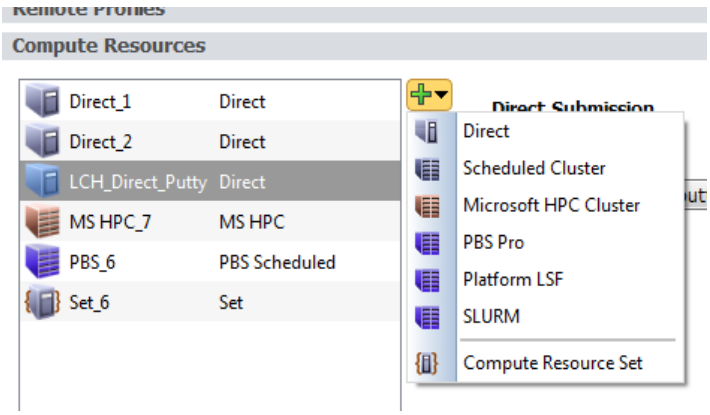
BENEFIT:
Extends support and fidelity of available operations used in formulas.



New Compute Resource Types

DESCRIPTION:
Additional platform resource types have been added; "PBS Pro", "Platform LSF" and "SLURM". These have the same properties as the generic "Scheduled Cluster" compute resource, but omit the submit and status commands as they are built-in to these platforms. The communication with the schedulers in these cases happen through their API's instead of commands.

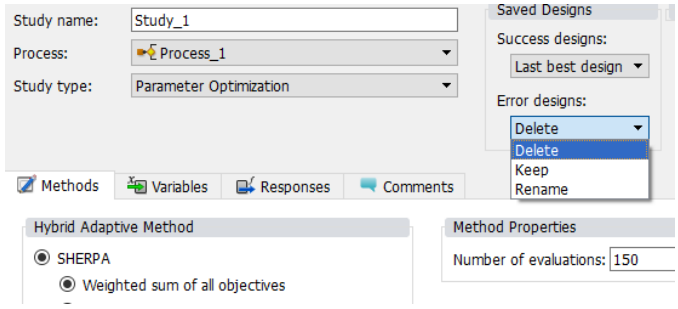
BENEFIT:
These platforms provide greater flexibility and robustness in scheduling jobs across hardware resources.



Design Folder Error Control

DESCRIPTION:
Users now have the ability to decide on what action will be applied when an analysis evaluation has an error.

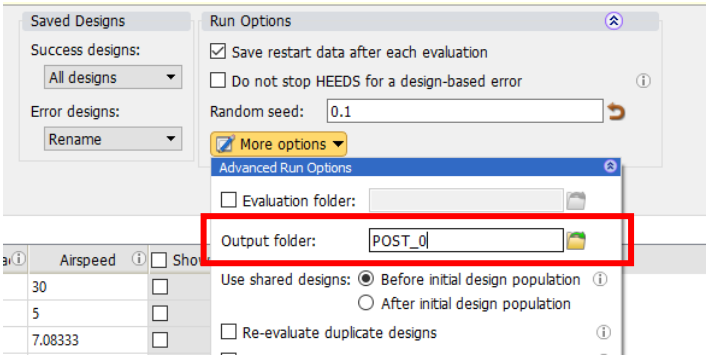
BENEFIT:
This provides greater results file flexibility and can significantly reduce unwanted disk usage from failed runs.



Output Folder Control

DESCRIPTION:
The destination folder name for results is now customizable from the Advanced Run Options Settings.

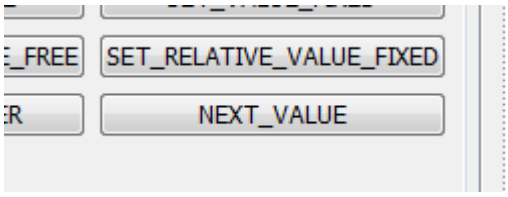
BENEFIT:
Increased control over the results file structure.



Vector Support in Script Tagging

DESCRIPTION:
Users can now tag vector data directly using script tagging for input files.
This feature allows the vector response generated, from an upstream analysis, to update the input file for a downstream analysis. Vector responses can also be tagged for input to the Python, MATLAB, and Excel Portals.

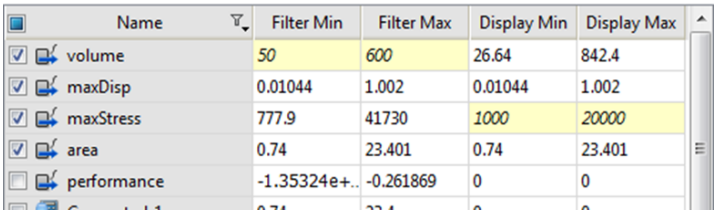
BENEFIT:
This simplifies the process of transferring vector data between analysis tools.



Results Processing

Value Change Highlight

DESCRIPTION:
Highlights have been added to the parallel plot filter table to identify cells that have been modified from their default values.



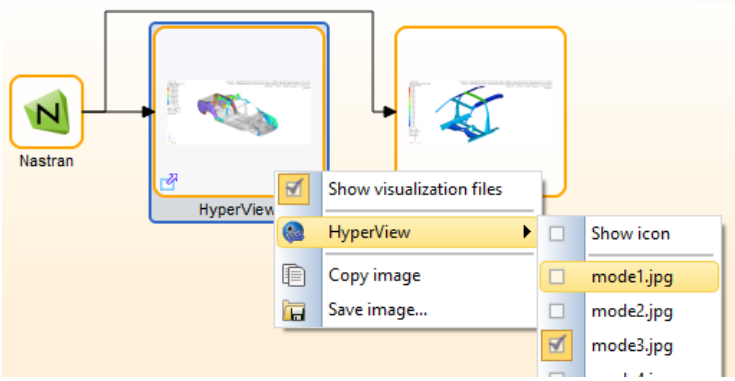
BENEFIT:
Visually highlights modifications made to the plot range/filter details.

Process View Image Support

DESCRIPTION:
The process view in the Study Analysis Details section, now supports the display of analysis visualization files. The images are synchronized with the design evaluation selected in the design evaluation history list.

The pop-out icon, on the lower left corner, will show the visualization file in a separate window. This is also available for analysis visualization files that cannot be rendered as a thumbnail (such as text, plot, video, or VCollab files).

This feature can be disabled by right-clicking and toggling the "Show visualization files" item.

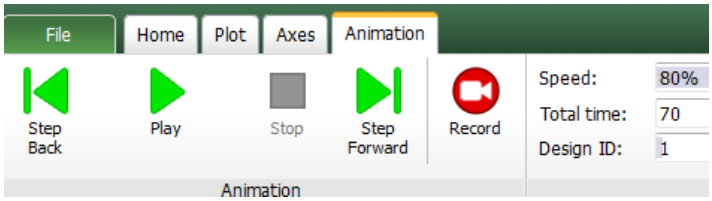


BENEFIT:
Visualize results in the process workflow during and after design exploration.

Save Animations to File

DESCRIPTION:
Any animation (i.e. process view, plots or custom views) can now be recorded to a video file. Users have control over the evaluation range, frame rate and either total time or time per frame. Videos can be exported in .avi, .wmv, .mp4, .mpg or .mjpeg formats.

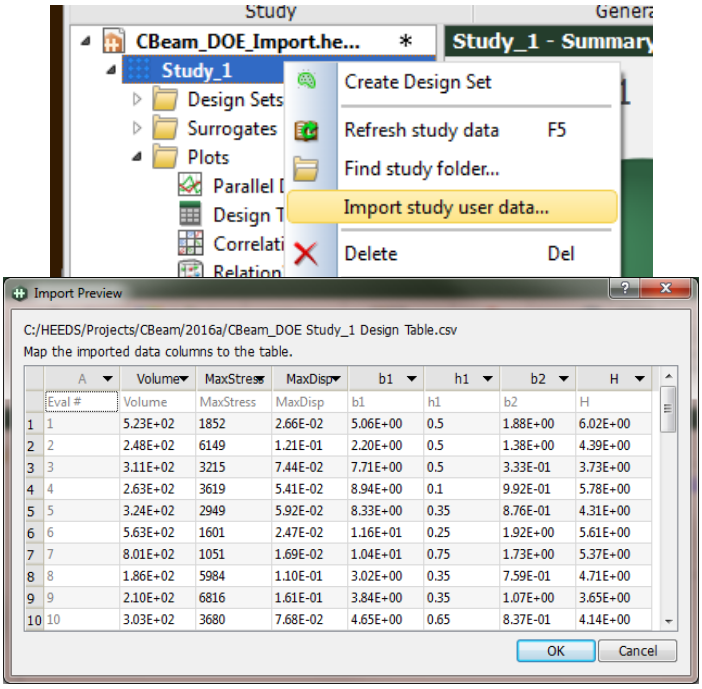
BENEFIT:
Easily share and review design exploration results outside of HEEDS.



Import Study User Data

DESCRIPTION:
A new "Import study user data…" option is available that allows result data from other studies, or sources to be included in the current study results. The data is added to a new dataset to enable easy comparison to the current study results data.
Similar to the import curve tool, the user can assign .CSV file columns to be associated with the Project Variables and Responses.
The imported data can be used for generating plots, surrogate models and more.

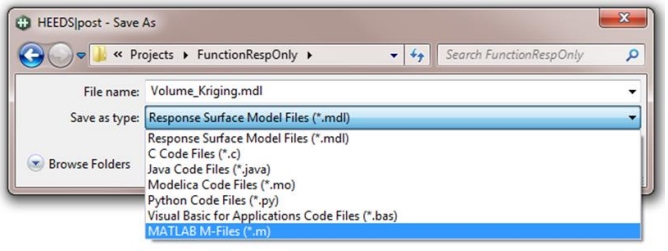
BENEFIT:
Compare and overlay results across studies or from experimental sources.



Export Surrogates to MATLAB m-files

DESCRIPTION:
The Surrogate export option now supports output for MATLAB m-files.

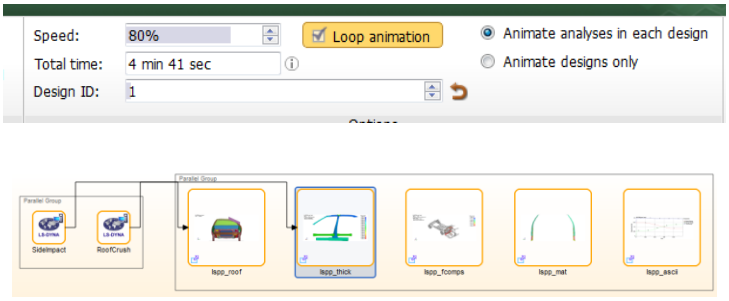
BENEFIT:
Expands surrogate export options for improved usability within MATLAB.



Process View Animation

DESCRIPTION:
In HEEDS POST, on the Analysis Details section of the study, you can now animate the Process view. The process steps can be animated in sequence or all at once per design evaluation.

BENEFIT:
Visualize synchronized changes through the entire Design Study for each evaluation.

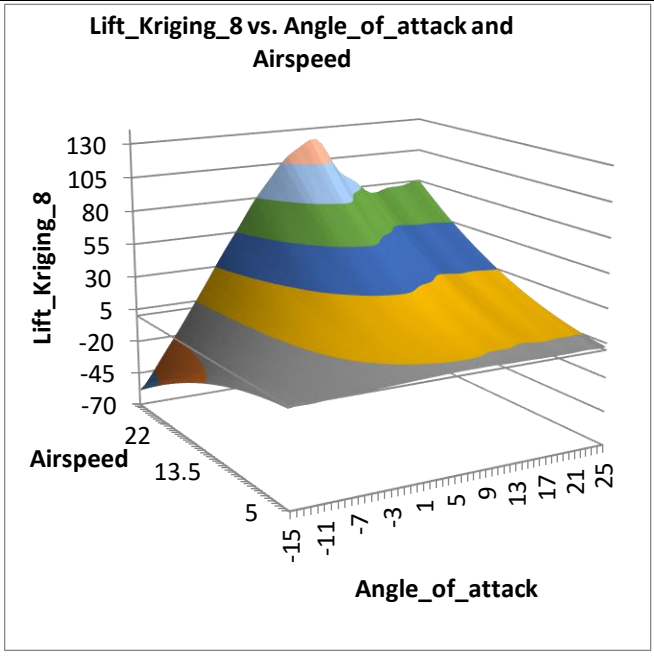


Export Surrogates to Excel

DESCRIPTION:
A new "Export to Excel…" context menu option is now supported for surrogates.
HEEDS Post will create a new .xlsm file containing the selected surrogates and a sheet displaying the surrogate results. Users change variable values in the spreadsheet to display updated surrogate response estimates. Surrogates can also be plotted.

BENEFIT:
Creates a portable and easy-to-use tool for "what-if" explorations such as sensitivity and robustness.

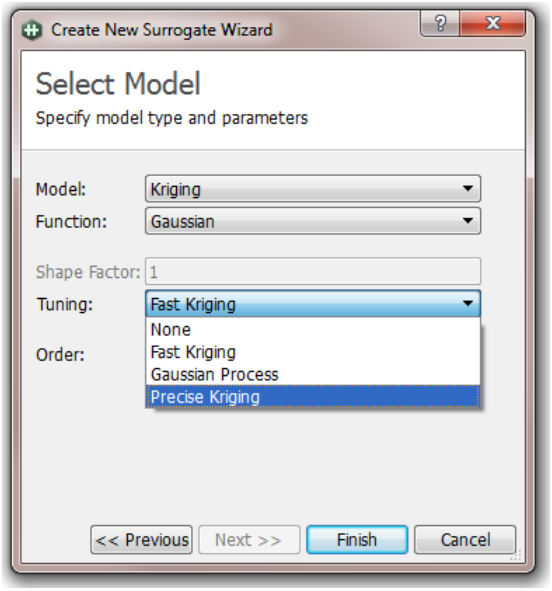
	A	B	C	D	E	F
1	**Variable**	**Value**	**Comment**			
2	b1	4	Flange width			
3	h1	0.1	Flange thickness			
4	b2	0.25	Web width			
5	H	3.5	Total beam depth			
6						
7	**Surrogate**	**Response**	**Value**	**Comment**		
8	Volume_RBF	Volume	57.14794	Total volume		
9	MaxStress_RBF	MaxStress	15082.65	Maximum stress		
10	MaxDisp_RBF	MaxDisp	0.342198	Maximum displacement		
11						



Enhanced Kriging Tuning for Surrogates

DESCRIPTION:
In the Surrogate create dialog and table, the Tuning setting now contains an additional "Precision Kriging" option. The old "Kriging" option has been renamed to "Fast Kriging."
The Precision Kriging option uses a more in-depth tuning strategy. This requires more computational time than the fast option, but generally gives better results.

BENEFIT:
Provides more flexible Kriging tuning fidelity.

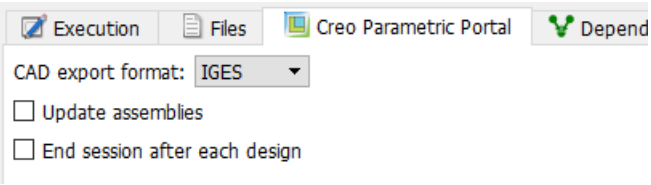


Portals

Single Creo Session Support

The Creo Portal now supports a single session for the entire study.

BENEFIT:
Reduces the time to complete each evaluation.



MDO Portal

DESCRIPTION:
MDO projects can now be nested as inner design exploration loops within a project. The best design or designs can be used from that loop for later analyses in the process workflow. Nested MDO projects that are not run in parallel, do not require additional HEEDS licenses.

BENEFIT:
Nested and Sequential Design Explorations are now possible.

FMU Portal

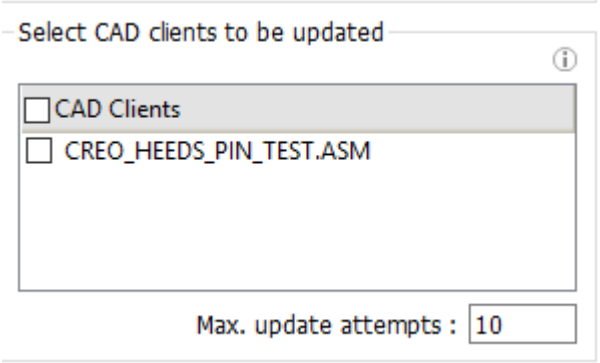
DESCRIPTION:
Functional Mockup Unit files allow for packaged models and analysis solvers to be easily integrated within other tools. HEEDS supports the co-simulation FMU files in slave mode where it can supply input to the FMU and receive output. FMU files don't require the parent software to be installed, but may still require licenses to be available for checkout.

BENEFIT:
Simplified integration of different FMU-based simulation models.

STAR-CCM+ - CAD Client Parameter Support

DESCRIPTION:
The portal now shows the available CAD clients (installation required) within the .sim file and parses any CAD client parameters associated with that client. The user can select any CAD client from the list to update. If a CAD client has any parameter tagged, this CAD client will be updated automatically.

BENEFIT:
Allows the portal to use CAD client parameters directly.

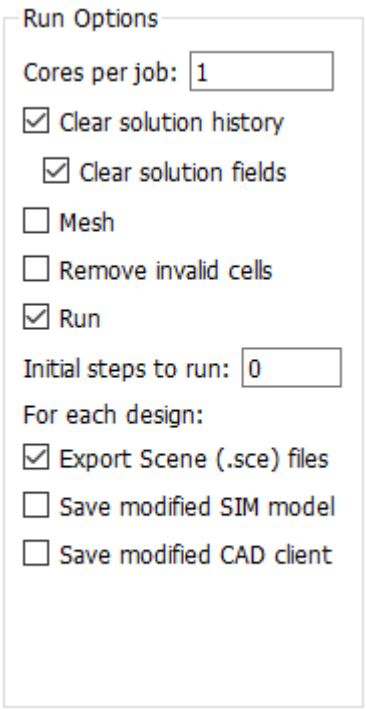


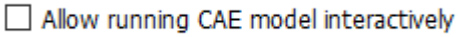
STAR-CCM+ Run options

DESCRIPTION:
New capabilities have been added to the Run Options:

1. Export .sce file to the analysis folder. As the .sce format is currently not supported in HEEDS POST, the user needs to use other viewer tools, such as STAR-View+.
2. Save modified CAD client - This option will save the .sim file if the CAD client model is successfully updated.
3. The "Initial steps to run" checkbox has been removed. To activate this option, the user enters a positive integer (N), which allows the analysis to run N steps before checking all the stopping criteria. Entering "0" will disable this option.

BENEFIT:
Additional flexibility for model execution, change retention and output control.



Abaqus Interactive Model Support	
DESCRIPTION: The Abaqus CAE Portal has an additional option that allows the user to run the Abaqus CAE session in interactive mode.	
BENEFIT: Provides a convenient way to debug errors when setting up a Abaqus workflow.	

Known Issues

1	**DESCRIPTION:** Video Export - Large view sizes and high frames per second can lead to errors when compiling the video.
	WORKAROUND: Reduce the size of the view window captured and/or reduce the frames per second to remedy.
4	**DESCRIPTION:** Job Controllers - PBS pro & SLURM make a distinction between scripts & binary executables; LSF & Direct controllers do not. This leads to some limitations - PBS scripts do not accept command line arguments and SLURM can only execute binaries if they are wrapped in a script.
	WORKAROUND: The Job Controller uses a simple script, for more control the user should use his own wrapper.
5	**DESCRIPTION:** Job Controllers - To distinguish between scripts & binaries, the Linux job controllers use the file command, but the Windows controllers have to rely on file extensions -- .exe for executable, and .bat, .cmd, .pl & .py for scripts.
6	**DESCRIPTION:** Job Controllers - At this time, spaces in paths (e.g., jobs to be executed, output files) are not supported.
7	**DESCRIPTION:** Job Controllers (PBS) - Job scripts must change to the design/analysis directory in order for the analysis output file to be written (e.g. cd "${PBS_O_WORKDIR}").
	WORKAROUND: The variable $PBS_O_WORKDIR is set in the code to point to the proper design/analysis directory for the job.

2016.10.0 Updates

Issue	Description
3796, 4294	Corrected the execution for the option to only evaluate the baseline design under the Run tab for Evaluation Only study types.
4061	Leading spaces are automatically removed from string parameters or string discrete set values shared in memory with the Python Portal.
3840	HEEDS does not back-up existing study results when re-creating designs.
4136	String values are now supported in dependent variables.
4338	The NX Portal supports spaces in the HEEDS path.
4083	The "Evaluation Folder" path option is fixed.
4051	The ANSA Portal documentation has been updated.
3685	The Creo Portal supports output values.
4414	The "Best Designs" default design set in POST is renamed to "Improved Designs". A new "Best Designs" default design set is created that includes only the designs that are better than the previous best design.