Analyst v13.03

What's New in Analyst-MP 13.03

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NATIONAL INSTRUMENTS

What's New in Analyst-MP 13.03

Analyst v13.03 Edition

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Analyst 13 Features

The Analyst™ version 13 software includes the following new features, enhancements, and user interface changes.

Migration Issues

Configuring Floating Licensing

In a FLEXlm floating licensing configuration, the license file is assigned to a machine designated as the FLEXlm license server. Each client workstation runs the Analyst™ application, requesting licenses from the server when needed.

Analyst™ V13 now requires FlexLM version 11.14.0 or later.

Environment

Units

Both "microns" and "micron" can be used as an alternative to "um" in expressions.

Foreign Characters in Projects

Analyst now supports the use of foreign characters in the project file names and paths.

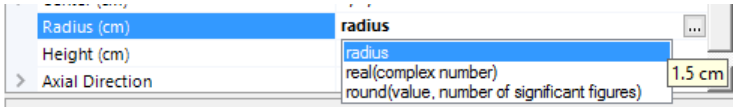
Structure and Annotation View Keyboard Camera Interaction

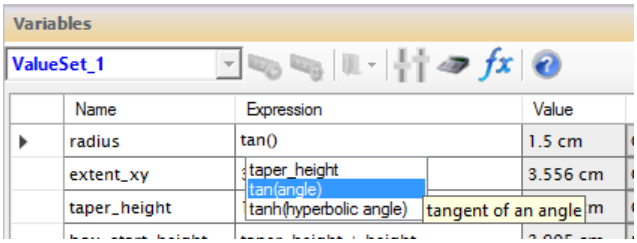
These views now support using the keyboard for camera rotation, panning, etc. See here for details.

Variables

Auto-Complete

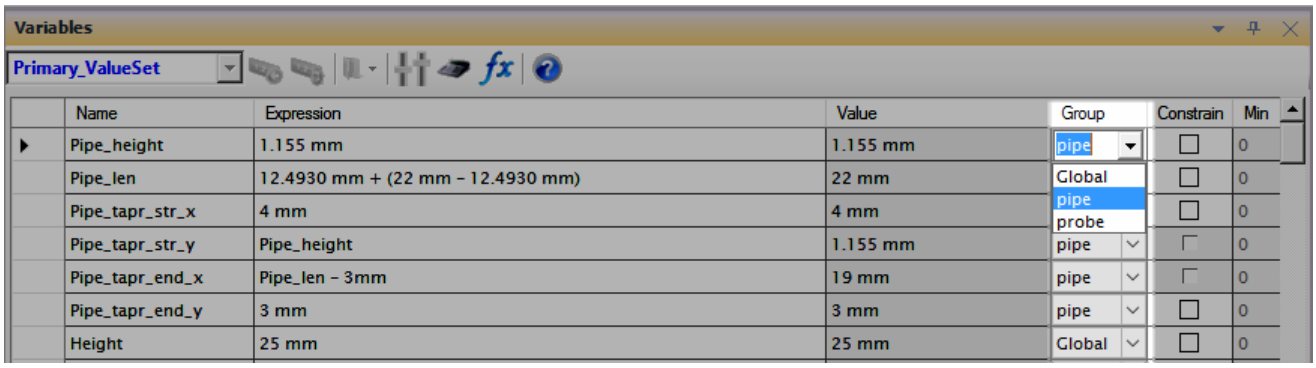
When editing an expression in a property grid, the **Variable Control** or **Value Set Management** dialog, a list of available variables, built-in constants and functions is presented in a list box. This list is dynamically filtered as you type to show items that match the content being typed. Items from the list can be selected by using the up/down arrow keys or by left clicking. Once highlighted, the item can be used to replace the word under the edit cursor by pressing the **Tab** or **Enter** or by double clicking. As functions are highlighted in the list, a tooltip is displayed to the right of the item that gives a description of the function. For variables, the expression is shown to the right.



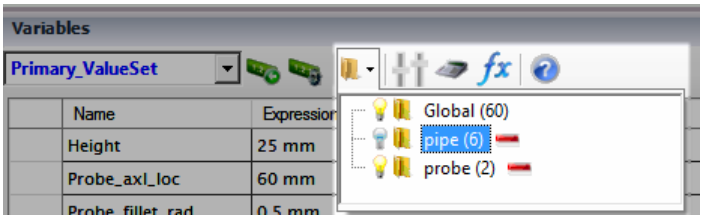


Grouping

The **Variable Control** now contains an additional column that can be used to specify which group a variable belongs to.



You can type in a new group name directly in this drop down box and use the **Edit Groups** button to control group visibility, rename, and delete groups. See here for more details.

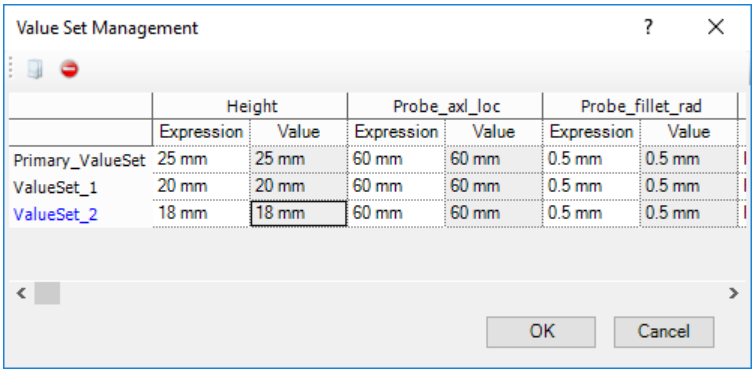


Sorting

The contents of the **Variable Control** can be sorted by both variable name or group by clicking on the table column header.

Value Set Management Dialog

The **Value Set Management** has been redesigned to make it easier to observe differences between value sets. It also supports editing, duplication, and renaming of value sets.



New Functions

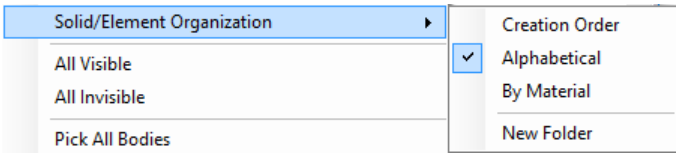
- An overload of the cellvalue function has been added in which the row and column are specified by header name instead of index.

- A round function has been added that supports rounding a number to the specified number of signficant figures.

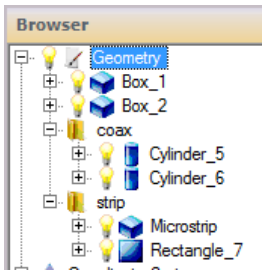
Geometry

Solid/Element Browser Tree Organization

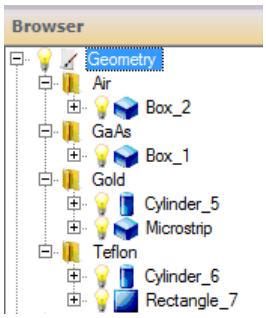
Solids and elements can now be organized in several different ways in the structure Browser tree. This includes in user folders. This functionality is accessed using the **Solid/Element Organization** menu items on the **Geometry** Structure Browser tree node context menu. Folder context menu items allow you to perform various actions on all solids included in the folder. See here for details.



- **Creation Order** - Solids and elements are displayed in the order in which the solids or elements were created. User folders are visible. This is the default ordering.
- **Alphabetical** - Solids and elements re displayed in alphabetical order. User folders are visible.

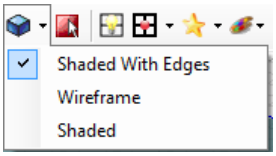


- **By Material** - Solids are displayed within folders that represent used Materials. This has no impact on sketch elements.



Shaded Without Edges View Style

In addition to **Shaded** and **Wireframe** styles, you can now now display faces without edges. This can aid in face picking in geometries with large edge counts.



Swept Solid Type Conversion

Switching between a sketched Sheet (2D), extrusion, and revolution can now be accomplished by choosing Convert To XXX from the solid's Structure Browser context menu. This makes transitioning from 2D to 3D easier.

Box Type

The box solid now include a **Type** parameter that allows for a **Start and End Corner** definition as an alternative to the default **Corner and Extent** definition. This addition can make certain parameterizations easier.

Excluding Operations

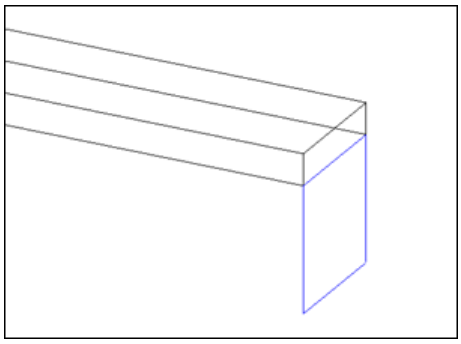
All non-creation solid and element operations now expose an **Include** parameter that allows for the operation to be excluded from the regeneration process. This can be used to parametrically exclude an operation such as a rotation from a solid or element.

STL Export

The geometry can now be exported in STL format for use in 3D printing.

Face/Edge Extrusions

This command now supports extrusion of an edge into a face. The default direction of an edge extrusions is normal to the largest face that contains the edge. This has a variety of uses, but a primary use is to create patches for lumped ports as shown below.



Importing Multiple Files

The dialog used to import SAT, IGES, STEP and other file types now supports multiple file selection so that several files can be imported in a single operation.

New Import File Formats

Import of binary ACIS (.SAB) files is now supported.

Simplify Parameter for Extrusions and Revolutions

Sketch-based and face/edge-based extrusions and revolutions now provide a **Simplify** parameter. If true, adjacent colinear element/edges produce a single face; otherwise they produce adjacent coplanar faces. This is useful if you need to apply separate attributes to such adjacent faces.

Sketched-Based Solid Type Conversion

Sketch-based solids can now be converted from one type to another using Browser context menu items. For example, you can convert a Sketched Sheet (2D) to a Sketched Revolution. This conversion maintains the contents of the sketch, but note that attributes must be revisited by the user.

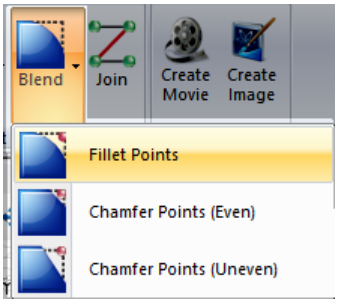
Solid, Element and Operation Order

Solids, elements, solid operations and element operations can be reordered in the Structure Browser by dragging the node above/below another node. The order can also be changed by choosing Move Up or Move Down from the node's context menu.

Sketcher Improvements

Polyline Blends

Interior points of polylines can now be blended (fillet/chamfer). This feature is accessed by using the **Blend** sketch ribbon drop-down button. See here for details.

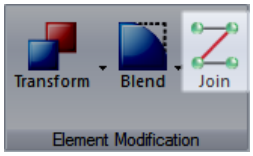


Construction Elements

All sketch elements now include a **Construction Only** parameter. If this value is true, the element is ignored during covering although it can be used for snapping, etc. Such element lines are rendered using a dashed line.

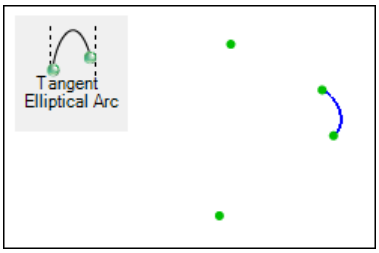
Joining of Lines and Polylines

Adjoining lines and polylines can be joined into a single polyline. This is particularly useful if you then need to apply blends to the resulting polyline. This feature is accessed by using the **Join** sketch ribbon button.



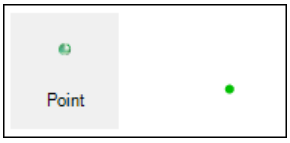
Elliptical Tangent Arc Element

You can now draw an elliptical arc specified by 2 tangent lines and a start and end point. The axes orientation can additionally be chosen from a list of options.



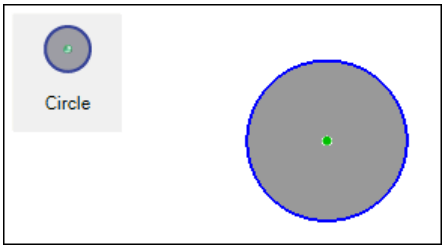
Point Element

You can now draw a point element. By definition, this is a construction only element and exists strictly for snapping, etc.



Center-based Circle Element

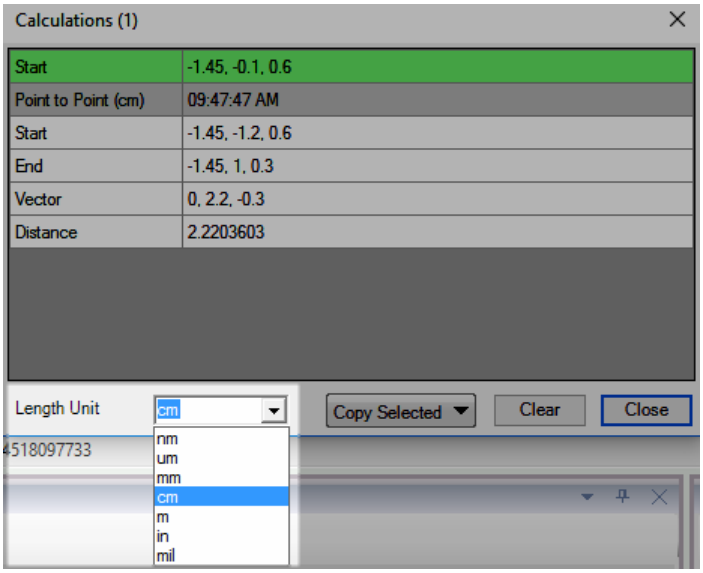
You can now draw a circle defined by a center and radius.



Calculations and Query Dialog Improvements

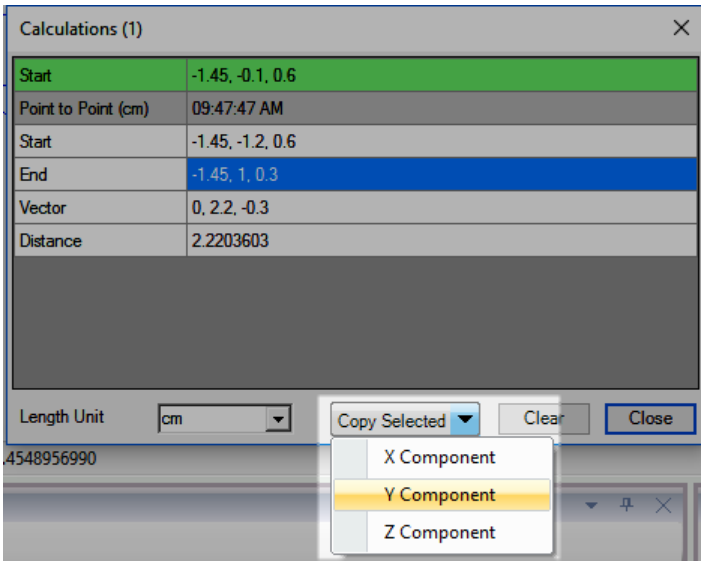
Length Unit

You can now override the working length unit in this dialog.



Vector Component Clipboard Copy

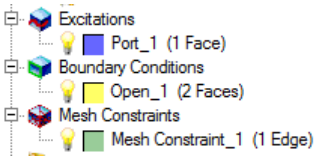
You can now copy a specific compnent of a vector cell to the clipboard.



Attributes

Application Count Indicator

Structure Browser tree nodes for attributes include a suffix that indicates how many bodies, faces, and edges the attribute is applied to as shown below. This can be turned off using the **Show Attribute Application Information (Structure Browser)** environment property.



Folder Visibility

Much like the **Geometry** folder in the Structure Browser, the **Materials** and four attribute folders now present a lightbulb icon that can be used to make all the contained items invisible. This is useful if, for example, you want to hide all faces with mesh constraints.

Attribute Propagation Though Booleans, Lofts, etc.

When creating a Boolean, loft, etc., attributes on the stocks and tools are now automatically propagated to the resulting solid whenever possible. In earlier versions, these attributes were always removed automatically.

Attribute and Material Order

Attributes and materials can be in the Browser by dragging the attribute/material's node above/below another attribute/material. The order can also be changed by choosing Move Up or Move Down from the attribute/material's context menu.

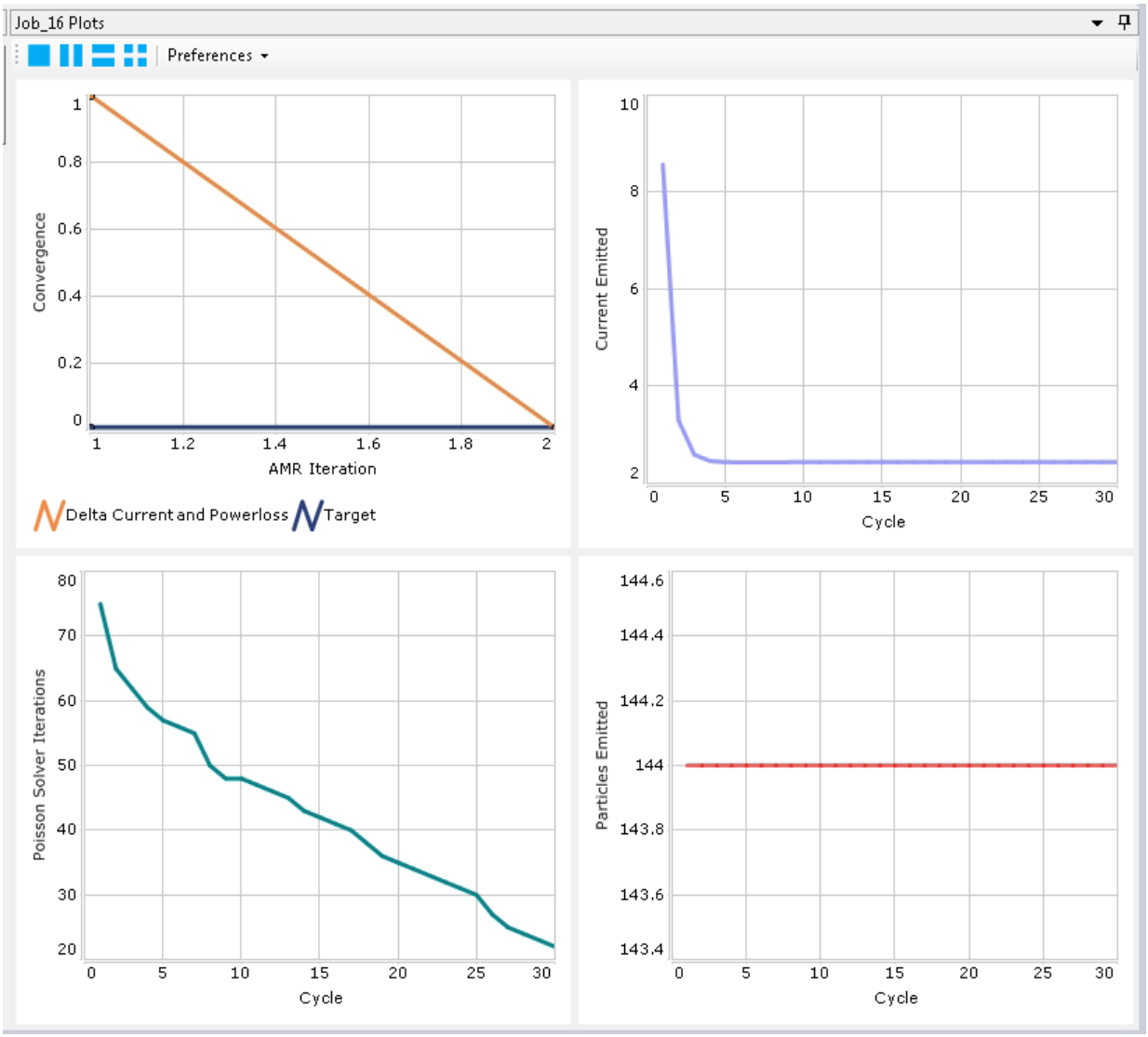
Simulation (Analyst-MP Only)

Performance

All simulators (except for MICHELLE) are faster in V13. While the specifics vary, on average simulations now take 40-50% less time than in version 12.

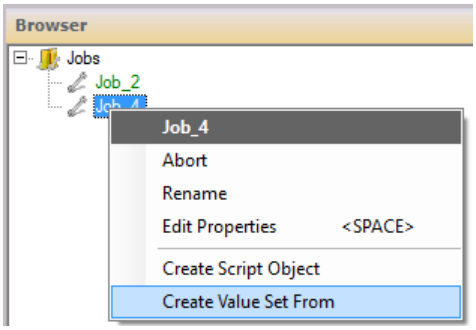
Real-Time Plots

As your simulation runs Analyst displays realitime plots of selected data in the Simulation view. See here for more details.



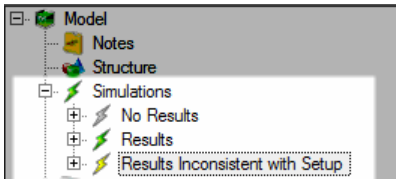
Restoring Variable Values From a Job

You can now create a value set using the variable values used when a simulation job is created by choosing Create Value Set From from the job Simulation Browser conext menu. A new value set named after the simulation and job is created and validated.



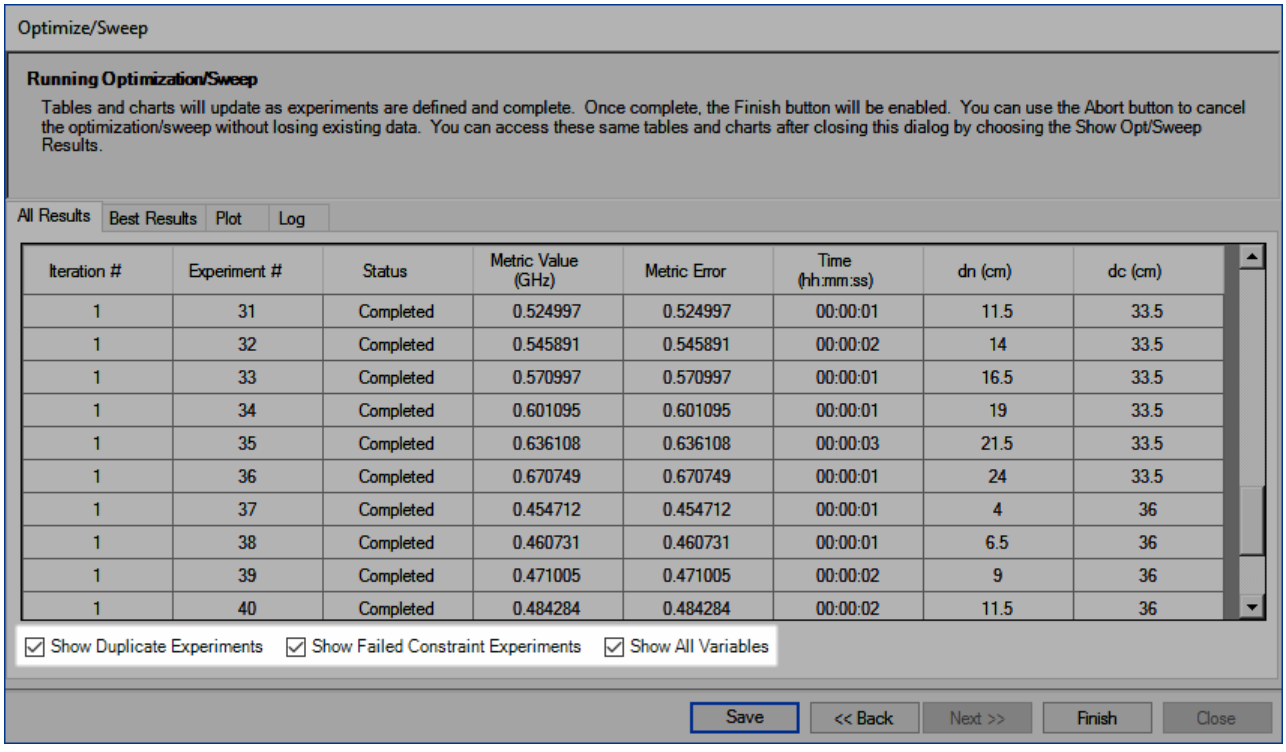
Navigator Simulation Tree Nodes

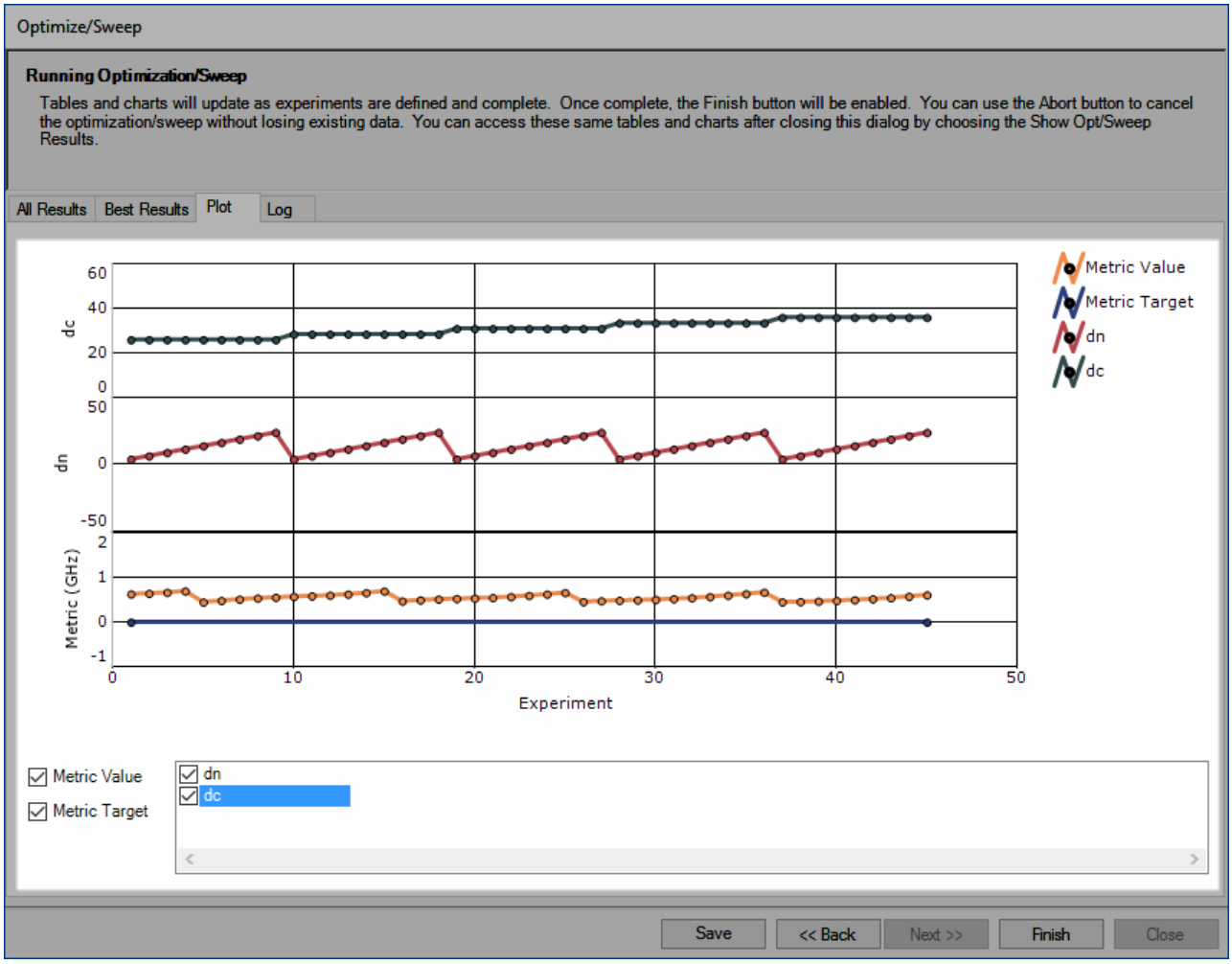
The color of the lightning bolt icon for simulation nodes in the **Navigator** tree now indicates the status of the simulation as illustrated here:



Improvements to the Optimization Results Dialog

Several additions to the optimization result dialog have been made to facilitate table column visibility and optional plotting of variable values vs iteration/experiment.





Restoring Variable Values from an Optimization Experiment

Once an optimization or sweep completes, it is not uncommon to need to reproduce a given experiment for further study. Several new options to do this are described here.

Control over Concurrent Job Execution

All simulators now ofter a **Allow Concurrent Execution** parameter that if false, will inform that job scheduler to run only one job at a time regardless of licensing and the number of processes/threads specified in the setup. This is an important parameter if you want to queue several large serial simulations instead of having several run at the same time.

Editing Multiple Simulations

You can configure more than one simulation of the same type by using multiple selection in the Navigator and then choosing **Properties** from the Navigator context menu.

Preferences

User and All-User Preferences can now be defined for simulations. This facilitates saving pre-defined configurations that can be easily reused across projects, etc. To create such a preference, choose Create Preference/User from the desired simulation's node context menu.

To create a new simulation from a preference, choose Create From Preference from the **Simulations** parent folder in the **Navigator**. Note that this menu item will not be shown unless preferences have been defined.

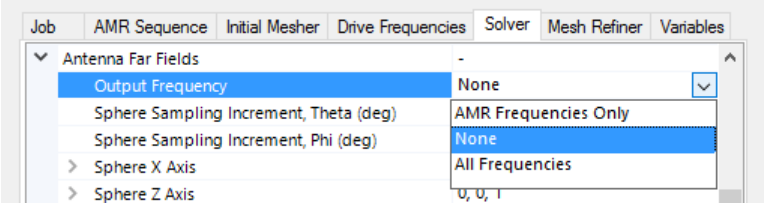
Driven Frequency (RF3p)

Frequency Sweep Type

When the Automatic sweep type is selected the solver now uses either a Discrete sweep or a GAWE sweep depending on which is likely to be faster for the given frequency count, port count, and parallel configuration.

Antenna Far Fields Frequencies

Far field frequencies are now specified independent from the volumetric field (E and H) frequencies. This results in reduced simulation times and project file sizes.



Antenna Far Fields Without PML

Far fields can now be output when using the approximate open boundary condition which is computationally less expensive but less accurate.

Spherical PML

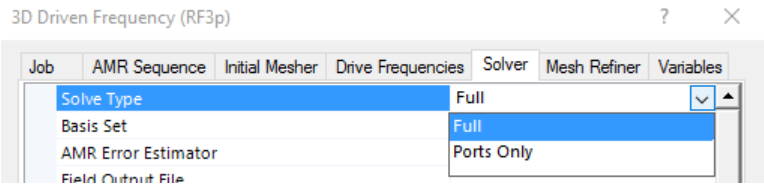
The PML (perfectly matched layer) boundary condition is now supported on spheres. In previous versions, PML was only allowed on rectangular enclosures. In many applications, spherical PML can be more efficient.

Cutoff

Significant improvements have been made to the fast frequency sweep algorithm when the spectrum crosses cutoff for wave ports.

Ports Only Solve

Ports only solves are now easier to configure; simply set the **Solve Type** parameter as desired.



Wave Port Parameter Change

The **Starting Mode Number** for wave ports has been removed as it was determined to produce unexpected and often non-physical results as lower order modes were being reflected at the port.

Surface Roughness

Analyst can now model the loss effects of conductor surface roughness for both thick and thin metal through either an impedance boundary condition or Electric Conductor (Bulk Conductivity) material.

Eigenmode (OM2p and OM3p)

Surface Current Density and Wall Loss Fields

OM2p and OM3p now output fields for surface current density and power loss.

Field Output

The calculation of all fields can now be disabled to reduce simulation time and project size.

Electrostatic Particles (MICHELLE)

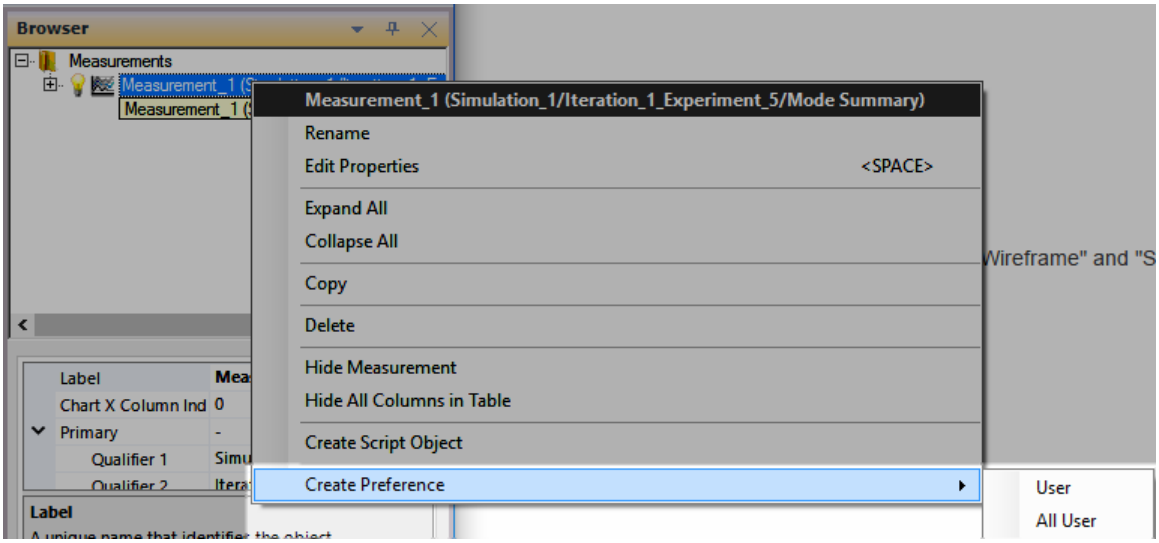
New Result Tables

Several new result tables are now available including Angular Momentum, Angular Frequency, VPerp Spread, Beam Alpha, Average Power Loss vs Time Step (and Time), Average Collected Current vs Time Step (and Time) and more. Access to some of these tables is controlled by a new set of parameters in the **Additional Beam Line Plots** section of the simulation setup. See here for details.

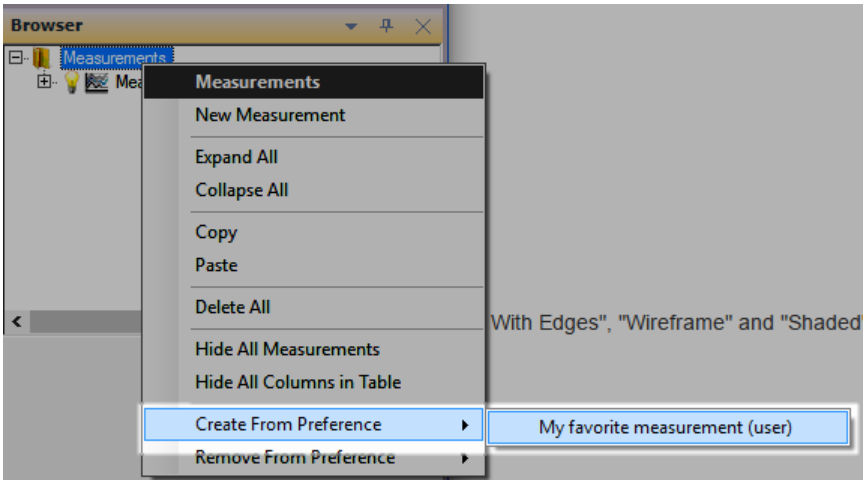
Post Processing (Analyst-MP Only)

Preferences for Annotations, Plots and Measurements

User and All-User Preferences can now be defined for annotations, plots and measurements. This facilitates saving pre-defined configurations that can be easily reused across projects, machines, etc. To create such a preference, choose Create Preference/User from the annotation, plot or measurement Browser context menu.



To create a new instance from a preference, choose Create From Preference from the appropriate parent folder (e.g. Measurements folder).



Annotation Visibility

Much like the **Geometry** folder in the Structure Browser, the **Annotations** folder now presents a lightbulb icon that can be used to make all the annnotations invisible with a single click.

Annotation Order

The order of the annotations displayed in the Browser can be changed by dragging the annotations's node above/below another annotation. The order can also be changed by choosing Move Up or Move Down from the annotation's Browser context menu.

Editing Multiple Annotations

You can configure more than one annotation by using multiple selection in the Browser and then choosing **Properties** from the Browser context menu. See here for more details.

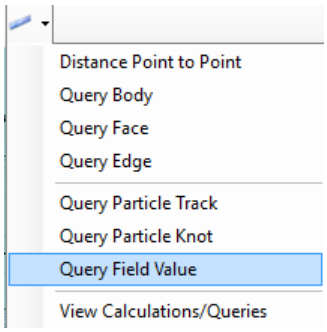
Creating a "cellvalue" Variable From a Plot Table

You can now create a new variable whose expression uses the cellvalue function to retreive that value of a given plot table cell using the context menu. This is very useful for optimization and sweeping and is much easier than manually writing the expression. See here for more details.

Field Annotations

Query

You can now query for vector and scalar field values using the mouse by clicking the **Query Field Value** item from the **Calculations and Queries** drop down button on the structure view toolbar. The resulting query will include field value (vector and/or magnitude) and location.



Legend Range Mode

The range mode (Manual, Automatic, etc) is now separately set for the minimum and maximum. For example, this allows the minimum value to be fixed at a given value while the maximum value remains automatic.

Regular Mesh Export of Scalar Fields

The field annotation regular mesh export now supports scalar fields. Previously only vector fields were supported. See here for details.

Particle Annotations

Legend Range Mode

The range mode (Manual, Automatic, etc) is now separately set for the minimum and maximum. For example, this allows the minimum value to be fixed at a given value while the maximum value remains automatic.

Knot Selection

Particle annotations now include a **Knot Indices To Show** parameter that controls which knot indices are shown (e.g "10-20, 30-40"). Note that corresponding track will always span from the first shown knot to the last shown knot of each particle.

Analyst Version 13.01 Minor Improvements

The Analyst version 13.01 software includes the following enhancements.

Environment

Faster Saves

Saving of complex projects with large result files and/or imported data files is signficantly faster than previous versions.

Geometry

New Export Type

Geometry can now be exported as a binary ACIS file (.sab extension).

Simulation (Analyst-MP Only)

Optimization and Sweep Improvements

Optimizations include a new parameter that can be used to limit the number of experiments that are simultaneously queued so users to control memory use and provide an opportunity to run jobs in different Analyst-MP session while an optimization is running.

Eigenmode (OM2p and OM3p)

PML

Fixed several defects related to using PML in OM3p simulations. PML is not supported in OM2p.

Electrostatic Particles (MICHELLE)

Linux Support

13.01 now includes pre-release support for running MICHELLE simulations on remote Linux clusters. Please note that these are serial simulations.

Post Processing (Analyst-MP Only)

Rendered Particle Count

Particle annotations now contain a read-only parameter for the rendered particle count in addition to the undecimated particle and knot counts.

Particle Decimation Change

Particle decimation is now applied after particles attribute visibility (i.e. generation, species, etc) have been taken into account.

Analyst Version 13.02 Minor Improvements

The Analyst version 13.02 software includes the following enhancements.

Environment

Faster Saves

Saving of complex projects with large result files and/or imported data files is signficantly faster than previous versions.

Project Compression

13.02 is the first version where the user can disable project compression. Doing say may result in much faster project open/save times at a risk of increased file size. Compression can be disabled using a new Environment Property named **File Management -> Saved Project Compression**.

Minimize Command Line Argument

You can now pass a /minimize argument to prevent Analyst from showing its main window when launched from the command line.

Simulation (Analyst-MP Only)

Eigenmode (OM2p and OM3p)

Surface Roughness

OM2p and OM3p can now model the loss effects of conductor surface roughness for both thick and thin metal through either an impedance boundary condition or Electric Conductor (Bulk Conductivity) material.

PML Support

OM3p now supports PML boundary conditions on exterior surfaces.

Conductivity in Impedance Boundary Conditions

Previously, OM2p and OM3p have not permitted use of nonzero conductivity to define the loss in impedance boundary conditions. Both OM2p and OM3p now support use of conductivity in impedance BCs, by converting the conductivity into an impedance at the shift frequency.

Metals with Realistic Conductivity

Previously, good electrical conductors were replaced by PEC when the simulation was configured to avoid simulating inside conductors. Now, in such simulations, good electrical conductors are modeled with the appropriate impedance boundary condition, where the impedance is determined based on the shift frequency, material conductivity, physical structure thickness, and surface roughness if present.

Analyst Version 13.03 Minor Improvements

The Analyst version 13.03 software includes the following enhancements.

Environment

Navigator

You can now access merged properties of items in the Navigator using multiple selection (e.g. plots).

Geometry

Face Normal Query

Face queries now include face normal information.