



INTEGRATED Version 10.2, January 2020 Release Notes

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Version 10.2 is the official release of incremental improvements that have been going into **INTEGRATED** programs since the release of version 10.1 last March. It does not contain significant changes to the user interface. A major interface upgrade will be officially released in the next few months.

API

Geometry Additions

- **Geometry_JoinTwoVolumes** (3D)
Equivalent to **Geometry>Join>Two Volumes**
- **Geometry_GetSurfaceArea** (3D)
- **Geometry_GetArcPointCoordinates** (3D)
reports start, end and mid-point of an arc
- **Geometry_GetLinePointCoordinates** (3D)
reports start and end points of a straight line segment
- **Geometry2D_GetRegionArea** (2D)
- **Geometry_SetConstantPlane_OFF** (3D)
Turns off 3D planar mode
- **View_SetObjectColor_ON** (All)
when ON, when the context is geometry editing the model appears with object coloring
- **View_SetObjectColor_OFF** (All)
when OFF, when the context is geometry editing the model appears with black lines and gray surface shading (except when the background is set as black, in which case the model appears with white lines)
- **Object_SetColor** (3D)
Set the Red/Green/Blue (RGB) value of the selected object

Physics Additions

- **Physics_SetEmission_OffsetSetting** (LORENTZ)
sets the distance from an emitter to launch rays in a beam
- **Physics_SetMaterialColor** (All)

- **Physics_GetMaterialColor** (All)

Solution Additions

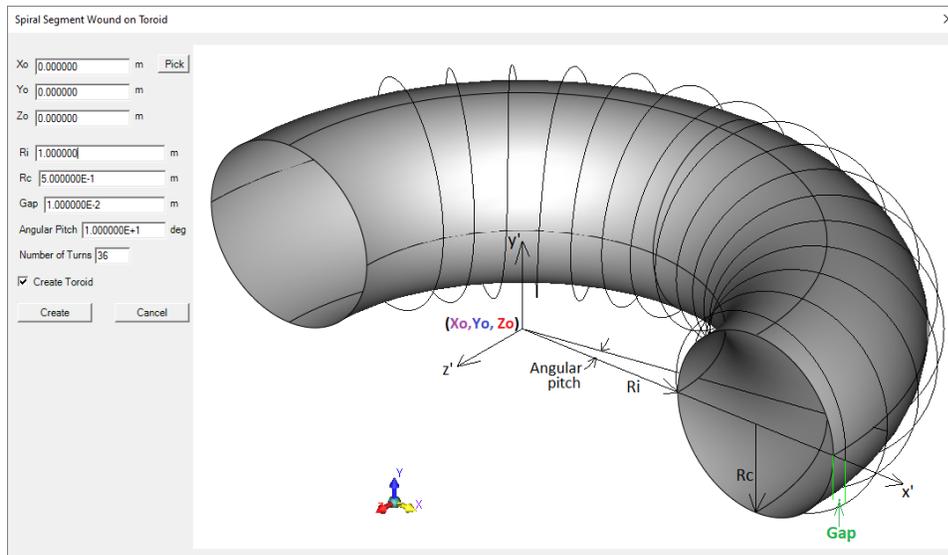
- **Solution_GetProblemSize** (All)
- **Analysis_SetBeam** (LORENTZ)
Sets the active beam number
- **Solution_SetSolutionMethod_AsBEM** (All with BEM)
When available, sets the solver method to BEM (Boundary Element Method)
- **Solution_SetSolutionMethod_AsLinearFEM** (All with FEM)
When available, set the solver method to Linear FEM
- **Solution_SetSolutionMethod_AsQuadraticFEM** (All with FEM)
When available, set the solver method to Quadratic FEM
- **Solution_SetMatrixSolver_AsAuto** (All field solvers)
Sets the program to select for you whether to use a direct or iterative matrix solver
- **Solution_SetMatrixSolver_AsDirect** (All field solvers)
Sets the matrix solver to **Direct**
- **Solution_SetMatrixSolver_AsIterative** (All field solvers)
Sets the matrix solver to **Iterative**

Analysis Additions

- **Analysis_Get2DVoltages_FromSegment** (2D Electric)
- **Analysis_GetEnergy_Total** (2D Electric)
- **Analysis_GetPowerLoss_ByRegion** (2D Electric)
- **Analysis_GetPowerLoss_Total** (2D Electric)

Spiral Around Toroid Tool

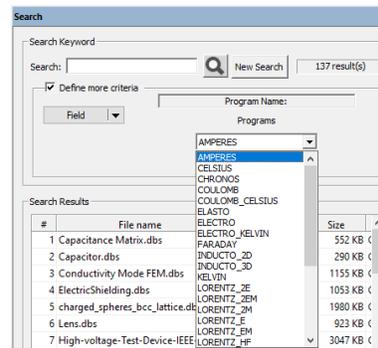
Geometry>Primitives now contains three tools for creating different kinds of spirals wrapped about toroid volumes.



Search

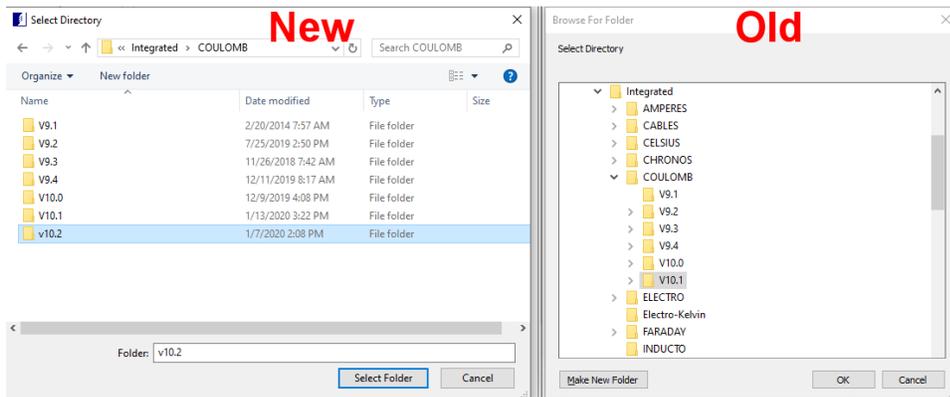
Sorting for the Program List in Search

When searching for models you can use “more criteria” to restrict the search. Previously the Program list was not sorted. This option is now much easier to use.



Selecting Folders to Search

The search folder selection had been using a more difficult to navigate dialog which didn't allow copy/paste for folder locations.



Miscellaneous Improvements

The software is undergoing continuous improvement which is very difficult to itemize, and the details of which are often only possible to explain by showing users' proprietary models. The improvements listed below are a summary of work such as speeding up an operation, expanding the reliability of an operation to work on a larger geometry, fixing flaws that show up in specific models, etc. to give you an idea of areas where 10.2 may look like 10.1 but will in general be working better.

File

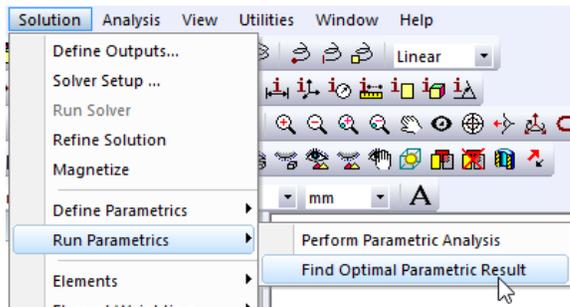
- Better surface recognition from STEP files
- When opening 3D magnetic models there were sometime problems recognizing whether a solution from a different module was valid.
- Fixed opening crash in FARADAY
- Loading invalid EMT files in LORENTZ now simply report an input error, but creates no problems
- Performance issue with loading STEP files
- Performance issue with merging models
- Saving data to file is now always readable text

API

- SetZoomCenterRadius no longer requires you to have started creating geometry
- Resolved issue reporting beam current in Lorentz to Matlab
- Mesh2D_Assign1D_AutomaticAll had some problems

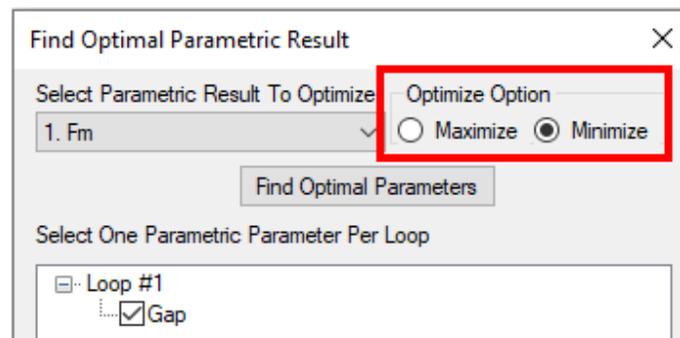
General

- Better automatic closing of dialogs in situations where they might produce problems if used
- Improved parsing of entered text in the search dialog
- Several performance improvements in Parametrics
- Version 10.1 introduced an **Optimal Parametric Result** search tool for find and build the ideal case from the output of a parametric results.



It was assumed that the optimal case would correspond to the maximum value of some property. However, in many cases the opposite is true. For example, a parametric to find voltages that focus an electron beam on a particular plane would seek the minimum spot size for the beam on that plane. Or, to minimize the chance of flashover, a high voltage parametric might seek. The minimum field at some point.

In version 10.2 the user can decide whether to optimize for the maximum or minimum of the selected parameter.



Geometry

- Joining volumes more than once with the API
- Improvement breaking of segments by a large number
- Better retention of volumes and surfaces when using "cut with plane"
- Improved healing of planar overlapping surfaces

- Improved connection between surfaces when sweeping attached cross-sections
- Better region display
- Healing surfaces more appropriately updates elements
- Improved Break by Intersection
- Fixed performance problems with primitive geometry tools
- Improved cutting segments with a plane
- More consistent updating of surface information when editing the boundary.
- Improved display of 3D geometry during opening and plane selection with a 2D program
- Grid snap works better with fine grids

Physics

- Improved Physics mode switching in LORENTZ
- Performance issue with source editor
- Able to setup coils in more models
- Transient Setup dialog performance issues were solved

Solution

- LORENTZ no longer shows invalid momentum on rays that are immediately deflected back into their emitter.
- Improved surface magnetization calculation in nonlinear models
- Better recognition of when to invalidate a solution after changing the ground setup in Physics Global Setup
- Improved space charge deposition in LORENTZ2D
- Improved solution with large multilayer coil in 2D
- Improved solving with nonlinear thermal conductivity
- Better solving large number of periodic sections

- Better retention of a FEM mesh when using self-electric fields in Lorentz
- Improvements to radial element refinement
- Improved FEM Mesh resetting when re-solving circuit parameter models
- Improved 3D element assignment
- Streamlines dialog now forced to be closed during solving
- Lorentz ray termination problems solved
- Improved FEM meshing
- Fixed FEM solving problem
- Parametric Setup no longer allows the same point two points to specify a rotation axis
- Trajectories in LORENTZ solve better with nonlinear magnetic materials.

Analysis

- Better contour plots in linear periodic models
- Improved User Defined Grids in 3D arrow plots
- Improved Contours on Surface with User Defined Grid
- Better retaining of predefined graph-on-segment information when editing geometry
- Current density plots working better in FARADAY
- 2D Streamline launch from both sides of segments when there is a non-zero field on both sides
- Oersted impedance reports both real and imaginary parts
- Contours display better with "On Plane" Option
- Fly-out menus now consistent with menus from right-click
- LORENTZ Restart file generation works better with collectors
- Improve volume calculation of flux linkage