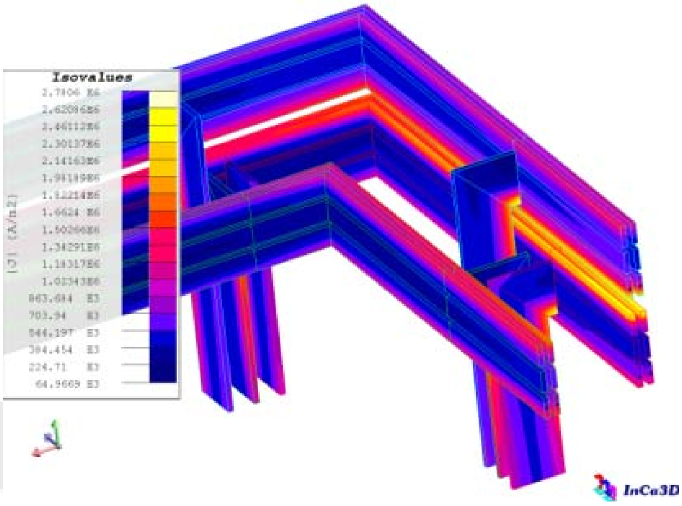
InCa3D 2.2 Release note

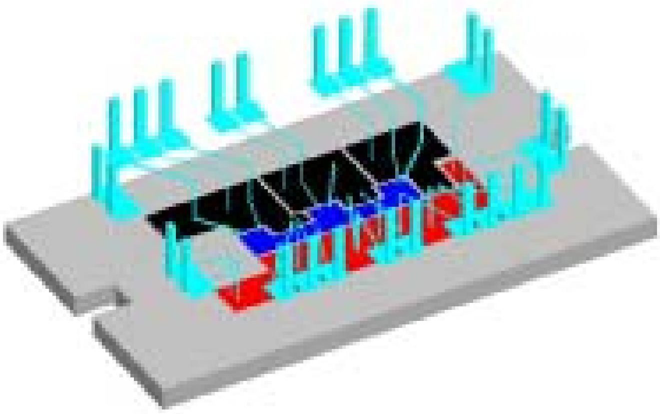
Reference **Date: June 14th 2011**
Version: InCa3D 2.2

In this document

This section contains the following topics:



Distribution bars



Power module model

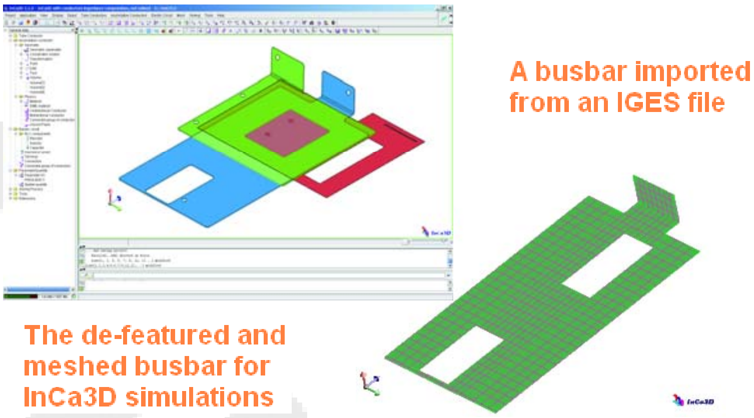
Import and de-featuring of MCAD files

General aspects

The most important feature of this version is certainly the ability to import geometries described in the most common MCAD (Mechanical Computer-Aided Design) formats like STEP, IGES and SAT files or native files from CATIA (v4 and v5) and Pro/E. This new functionality is based on the 3D modeller ACIS kernel, provided by Spatial Corporation.
The simulation of complex structures (e.g., a power module, a system of distribution bars or a switchboard) is thus very simple and fast, thanks to a dedicated environment where users can also automatically clean up or heal the imported files.

Example of de-featuring

An example of this facility is shown in the figures here below: all the little holes have been deleted and the blends transformed into right angles. These mechanical details have minimal influence on the electromagnetic simulation results but they are very consuming from meshing and computational points of view.
The user is also able to cut, by means of virtual planes, the objects of the imported geometry, in order to have a final geometry which is simpler to model and mesh in InCa3D.
The construction of the bi-directional conductors, modeling for example the external case of a power module, is particularly efficient. All these de-featuring operations can be made easily due to provided procedures.



New algorithm for bond-wires

Another capability related to the MCAD import is represented by the algorithm which allows a user to create unidirectional conductors from one or more imported volumes, which may not only have planar surfaces.
For example, it is very useful to model cables or PCB bond-wires: the user simply has to define the input and output faces and InCa3D automatically generates the meshed conductors approximating the volume of the bond-wire.
New predefined conductor profiles are also available (circular full, circular hollow and rectangular hollow sections), and their construction has been automated.

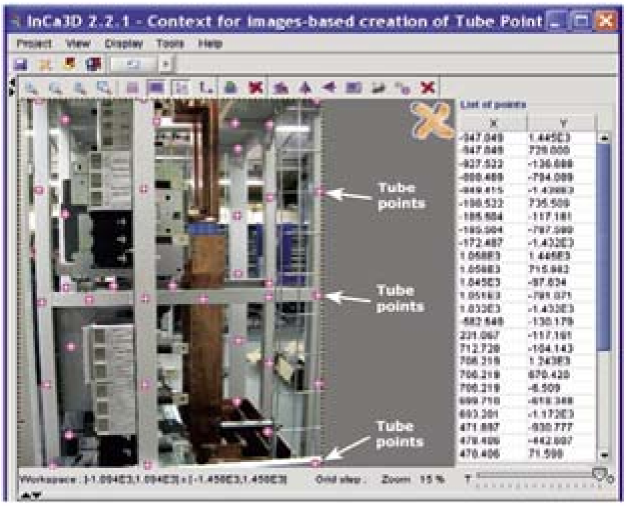
Images-based conductor creation

General aspects

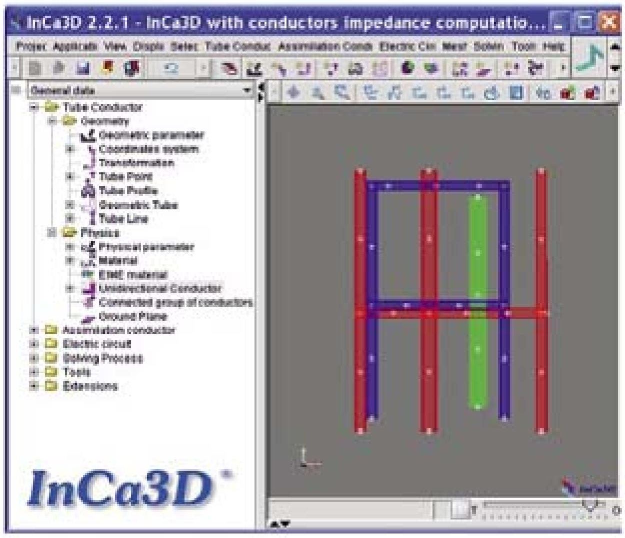
The InCa3D users also have the possibility to capture an image (accepted formats: BMP, GIF, JPG, PNG and TIF) with the goal of easily drawing at the real size one part or the totality of the structure to simulate. In a specific context for images-based creation, the picture becomes the InCa3D wallpaper where users can draw by simple mouse clicks all the fundamental points necessary for creating the geometry. After exiting this context, the user only has to define the corresponding unidirectional conductors by referring to the plotted points.

Example

An example of this new function is shown in the figures below.



Tube Points plotted in a picture (Courtesy of ACC03 - Montluçon - France).



Creation of Geometric Tubes based on the Tube Points plotted on the image.

Parametric solving

General aspects

Version 2.2 of InCa3D also allows the user to perform multiple parametric solving, by means of an extended scenario definition. This functionality will help engineers to find the optimized values for some parameters or key-properties of the considered system, like for instance the position of some conductors, the shape of their cross-section or the amplitude of the power supply sources.
It is also possible to plot 2D curves showing the evolution of the output quantities in function of the parameter to optimize.

Impedance export

General aspects

It is now easier to export towards external circuit simulators an equivalent macro-component of the structure.
The user is supported by a functionality which is able to automatically create and connect the minimal number of impedance probes necessary to measure all the impedances desired. To make this possible, the user has just to define the terminals of the structure that should become the pins of the macro-component.

VHDL-AMS

In the long list of achieved developments, a last (but not the least) feature worth highlighting is the synthesising of the extracted equivalent circuit into the VHDL-AMS format by the "Conductors Impedances" application. Thanks to this IEEE standard language, the inclusion of InCa3D models into system-level simulators, like Portunus, is more robust and efficient. The user can also continue to export the results into SPICE, Modelica or SABER formats.

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Python update to v2.2

General aspects

The Python syntax has been modified for some InCa3D commands, in order to improve their efficiency. The most important changes are listed in the following paragraph.

Most important changes

In particular:

- the user is now able to create propagated Tube Points in addition to their definition by parametric coordinates;
- the propagation of Geometric Tubes is now done using a transformation which is an entity itself in the InCa3D project. The same transformation can be used in any type of propagation and/or extrusion (Tube Points, Geometric Tubes, Points, Lines, Faces and Volumes);
- the Python solving command has also changed; in fact, before the solving process can really start, the user has the choice to save the solved InCa3D project in the current folder or in another one;
- a last modification has been done concerning the orientation of the profile of the Geometric Tubes.

The new macro

That's why a new macro has been developed in order to help the user in the conversion of the old Python files (from version 2.1) into the new version of InCa3D. It is called "PythonUpdateToV22.PFM" and provided (by default) in the folder:
\Cedrat\Extensions\Macros\InCa3D_Miscellaneous\