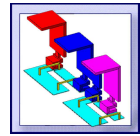


1. Release note for InCa3D 2.1

Reference **Date: 1st of September**
Version: InCa3D 2.1

In this document This section contains the following topics:

Topic	See Page
Major improvements	2
Other improvements	4
Required configuration	8
About installation	10



1.1. Major improvements

Generic solver Version 2.1 of the InCa3D software takes into consideration almost any configuration of three dimensional conductors. Geometries are no longer restricted to perpendicular or parallel conductors. This new major features is possible thanks to a new generic solver using semi analytical formulas.

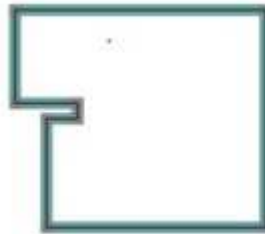
64 bits With 32 bits processors, the memory is limited to 2 GB per process. This limit can be extended to 3GB on specific Windows 32-bits systems with the 3GB-mode (see Installation guide §2.4 for more information). In order to extend the solving possibilities of InCa3D, version 2.1 is now compatible with 64 bits processors. 64-bits processors do not have this 2-GB-per-process limit and it is theoretically possible to allocate 2^{64} Bytes of memory for one process. So the user can actually allocate as much memory as available on the computer or server to InCa3D and therefore solve bigger problems with the software.

Complex profiles for tubes Previously restricted to conductors of rectangular cross section, the description of tube conductors is now extended to conductors with:

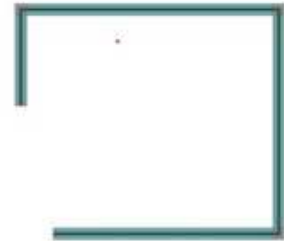
full section –
closed profile



hollow section –
closed profile



hollow section –
open profile

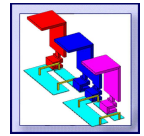


3D display of electric component

Electric components that can be connected to the structure modelled can be displayed in the 3D geometrical view. The user can define the location of graphic symbol of components R, L, C, current or voltage sources. Four options are proposed:

- automatic location
 - location by terminal and ratio
 - location by terminals
 - location by pins coordinates
-

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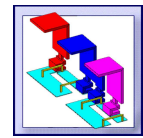


Algorithm for automatic connections

This algorithm searches and detects all the intersections between the faces of unidirectional and bidirectional conductors. If at least two faces involved in the intersection have terminals, an equipotential connection is automatically created.

Export to Spice and Modelica format

In addition to the existing exports to Saber and Portunus, it is now possible to export the reduced impedance matrix given by the “conductors impedances” application in the Spice and Modelica format.

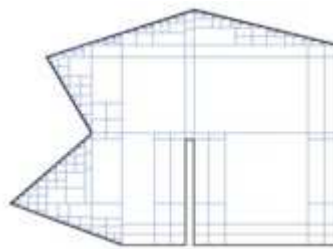


1.2. Other improvements

Mesh

The automatic mesh according to frequency has been improved in order to better take into account the shape of unidirectional conductors with variously-shaped cross section. A refining technique on the edges is applied in order to better follow the contour lines of the geometry and to take into consideration the skin effect: Besides, the meshes, that are not included in the thickness of skin depth and whose dimensions enable the merging, are merged in order to reduce the total number of meshes.

Example of mesh on the section of a unidirectional tube of complex-shaped full cross-section:



Check Physics

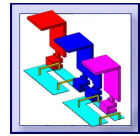
The Check Physics feature is an algorithm used to review the geometric and physical coherence of the InCa3D project being modelled. Three kinds of data are provided: errors, warnings, information.

The algorithm for the Check Physics is enabled either manually by the user during the modeling process or automatically by InCa3D when the user asks for the solving of the problem. The Check Physics is the second step (the first one is the mesh) before the solving process.

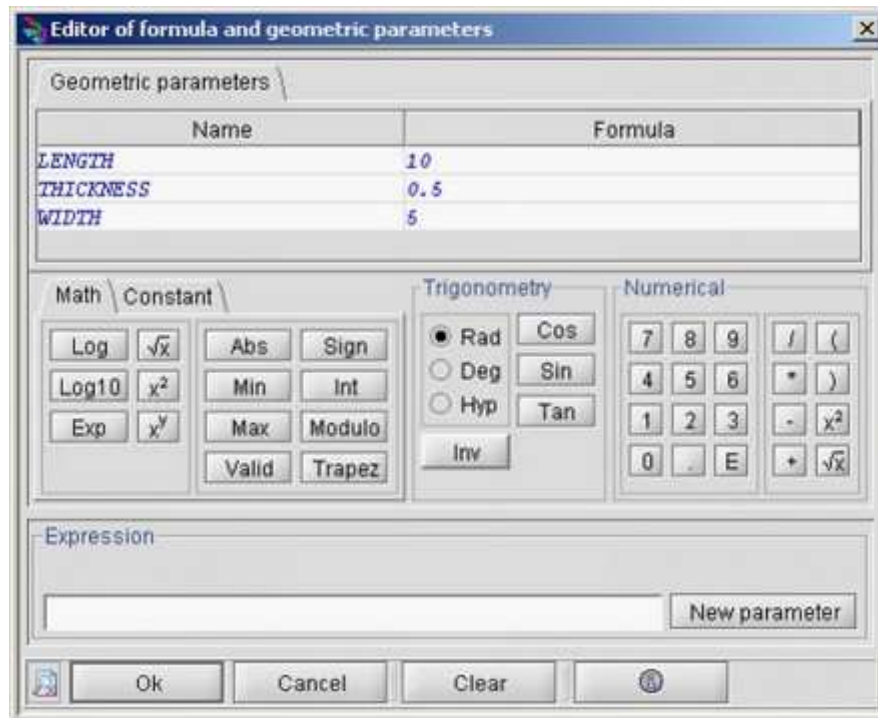
RMS values

All results provided by InCa3D with the “supplied conductors” application (except losses and Laplace forces) are now given in RMS value and no longer in peak values.

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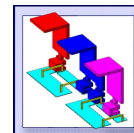


Formula editor Throughout the construction of an InCa3D project, numerous information items can be entered as formulas: expression of a geometric parameter, points coordinates, etc. To facilitate the user's work, a new interactive formula entering tool is provided: the formula editor.



- It is composed of three distinct zones:
- list of geometric parameters, previously defined, and their values
 - available operators or mathematical functions
 - current display of the expression with possibility to define, if necessary, new geometric parameters

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Arrows

Spatial vectorial quantities can be displayed by means of colored arrows on the conductors or 2D grids. That way, not only the magnitude is displayed but also the directions.

The spatial quantities that can be displayed by means of arrows are:

- current density and its three components (X, Y or Z)
- magnetic flux density and its three components (X, Y or Z)
- Laplace force density (the average component as well as the 2ω pulsating component) and its three components (X, Y or Z)

2D spatial curves

A 2D spatial curve represents for a given frequency the evolution of a local (scalar) physical quantity on a path of points defined by the user.

The physical quantities that can be displayed with 2D spatial curves are:

- current density
- Joule losses density
- magnetic flux density
- Laplace force density: average component as well as 2ω pulsating component

Colour shades

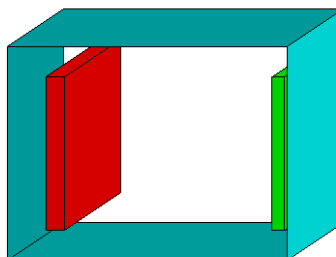
Maximum and minimum scale of the values displayed can be changed. Seven different colour shades are available.

Post-processing computation times

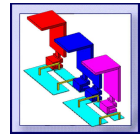
Post processing computation times have been highly reduced. With InCa3D version 2.1, post processing results are computed at least ten times faster than with the previous version.

μ PEEC

The PEEC method has been extended in order to take into account ferromagnetic materials. However, to be valid the so-called μ PEEC formulation have limited field of application. The use of materials with magnetic properties (linear, homogenous and isotropic) is restricted to parallel tube conductors of hollow section. This functionality can be used to investigate the effects of magnetic shielding for instance (see illustration below).



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Coupling to Icepak (Fluent)

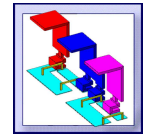
Four macros enabling the coupling to Icepak are provided to:

- import geometries from Icepak to InCa3D
- export to Icepak results given by InCa3D

The data exchange is done by the means of exchange files either read by InCa3D (for the geometry import) or created by InCa3D and readable by Icepak.

Coupling to EIME

Two macros are available to import material properties from EIME software (eco-design). They can be used to import the properties of materials from EIME to InCa3D or to export the results provided by InCa3D (losses) to EIME.



1.3. Required configuration

Operating systems

InCa3D V2 is guaranteed on the following operating systems:

- Windows 2000 Professional
- Windows XP Professional (32 or 64 bits)
- Windows Server 2003 (32 or 64 bits)
- Windows Vista (32 or 64 bits)

InCa3D V2 is no longer supported on the following operating systems:

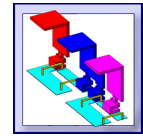
- Windows 95
- Windows 98
- Windows ME
- Windows NT Workstation

Minimum configuration requirements

To run the InCa3D V2 applications on a computer, the minimum requirements are:

Element	Characteristics							
Processor	<ul style="list-style-type: none"> • Intel or AMD • 32 or 64 bits • mono core or multi core 							
Memory	<table border="1"> <thead> <tr> <th>Application</th> <th>General</th> </tr> </thead> <tbody> <tr> <td>Hard disc</td> <td>20 GB</td> </tr> <tr> <td>RAM</td> <td>1 GB</td> </tr> </tbody> </table>		Application	General	Hard disc	20 GB	RAM	1 GB
Application	General							
Hard disc	20 GB							
RAM	1 GB							
Screen	1024 x 768 pixels							
Graphics card	<ul style="list-style-type: none"> • latest, OPENGL V2.0 compatible for the use of new graphics technology (see details on next page) • with 256 MB of memory (NVIDIA chipset recommended) 							
Mouse	Microsoft compatible (with a wheel)							

Continued on next page



Recommended configuration

To run the InCa3D V2 applications on a computer, the recommended configuration is:

Element	Characteristics											
Processor	<ul style="list-style-type: none"> • Intel or AMD • 32 or 64 bits • mono core or multi core 											
Memory	<table border="1"> <thead> <tr> <th colspan="2">Application</th> <th>General</th> </tr> </thead> <tbody> <tr> <td colspan="2">Hard disc (≥ 10 000 turns/min)</td> <td>50 GB</td> </tr> <tr> <td rowspan="2">RAM</td> <td>32-bit operating systems</td> <td>2 GB</td> </tr> <tr> <td>64-bit operating systems</td> <td>4 GB</td> </tr> </tbody> </table>	Application		General	Hard disc (≥ 10 000 turns/min)		50 GB	RAM	32-bit operating systems	2 GB	64-bit operating systems	4 GB
Application		General										
Hard disc (≥ 10 000 turns/min)		50 GB										
RAM	32-bit operating systems	2 GB										
	64-bit operating systems	4 GB										
Screen	1280 x 1024 pixels											
Graphics card	<ul style="list-style-type: none"> • latest, OPENGL V2.0 compatible for the use of new graphics technology (see details on next page) • with 512 MB of memory (NVIDIA chipset recommended) 											
Mouse	Microsoft compatible (with a wheel)											

Graphics card

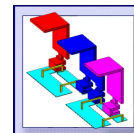
To improve the display speed, InCa3D V2 uses a **new technology** for the graphics interface. This new technology allows an improved graphics display and the acceleration of the graphical representation when moving the device in the graphic zone.

This technology requires the use of a **recent graphics card**: i.e. graphic card compatible with OPENGL V2.0.

A recap of the conditions of use is presented in the table below.

Conditions of use
Installation of a graphics card compatible with OPENGL V2.0: <ul style="list-style-type: none"> • NVIDIA GeForce 6200 and subsequent ones • ATI Radeon X1300 and subsequent ones
Installation of the latest version of the card driver
Activation of the graphic acceleration: <ul style="list-style-type: none"> • In the Displaying properties box choose the option Parameters and click on the Advance button • In the Properties of Graphics Card Name box choose the option Service and in the Hardware acceleration zone move the cursor to the right in the Complete position

Note: INTEL graphics cards do not support OPENGL V2.0



1.4. About installation

Silent installation

The InCa3D installer was created by the NSIS software:

http://nsis.sourceforge.net/Main_Page

The users, who want to perform a silent installation via scripts, can use the command: “setup.exe /S /D=rep_install”

example: setup.exe /S /D=c:\cedrat

For more information, refer to the NSIS documentation:

<http://www.todae.fr/nsis/docs/> (French)

<http://nsis.sourceforge.net/Docs/> (English)
