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MONOPHASE IM MOTOR WITH OUTER ROTOR

Flux 2D : Project step by step

Summary

- Introduction

- Building geometry and mesh with overlay

- Defining the physics

  - Application

  - Material

  - Circuit

- Solving scenario

- Post-processing

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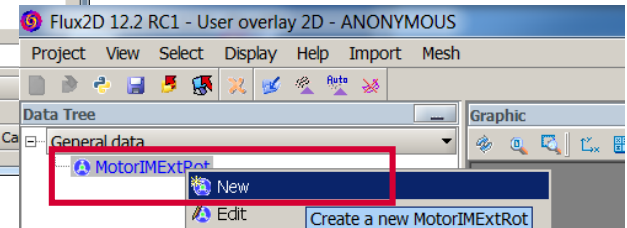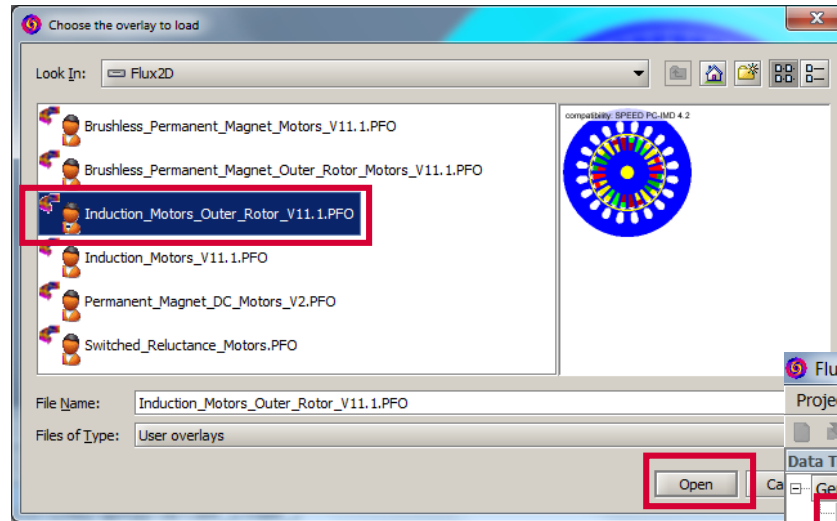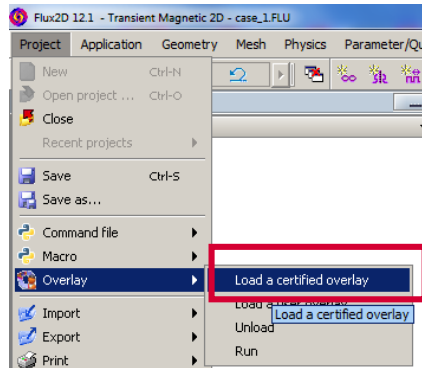
Starting a new project : new project

- Open Flux supervisor

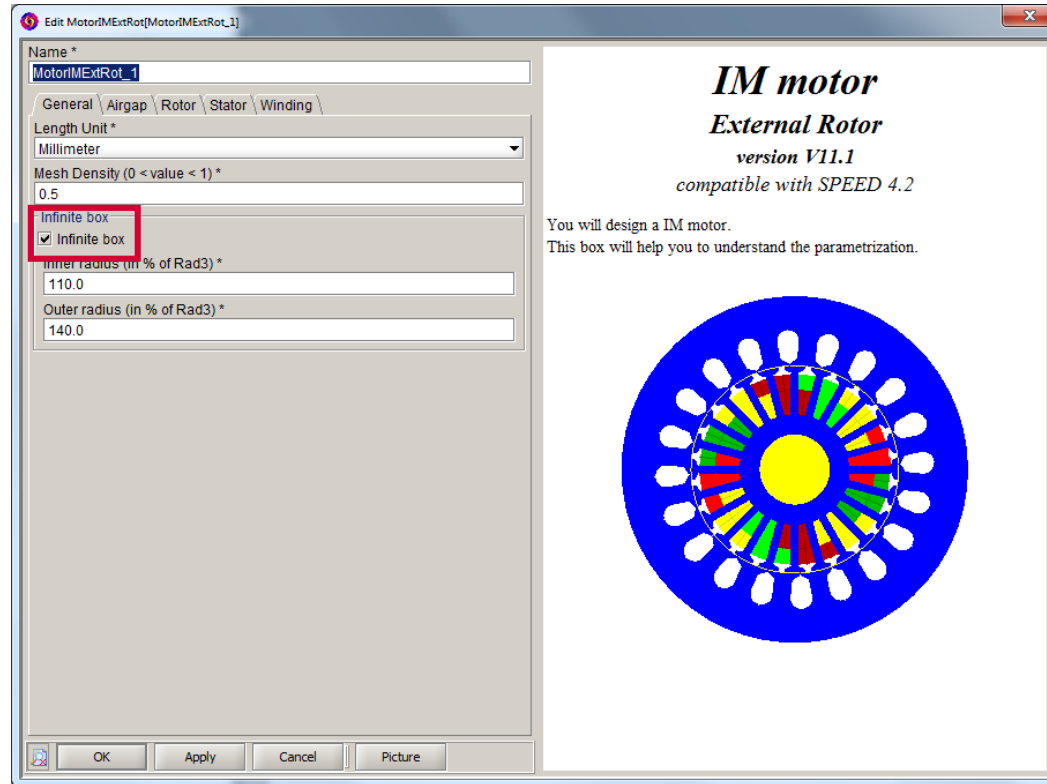- Start a new project

Start a new project

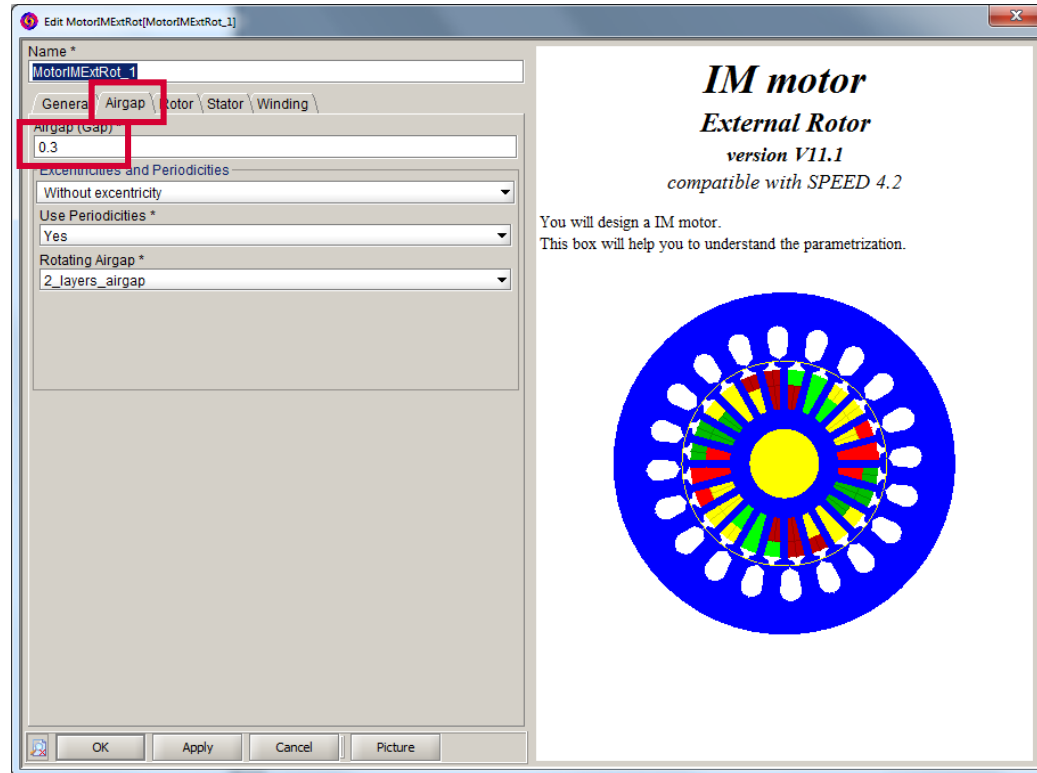# Building geometry and mesh with overlay

- Leave sketcher context: [project] [return to standard geometry context]

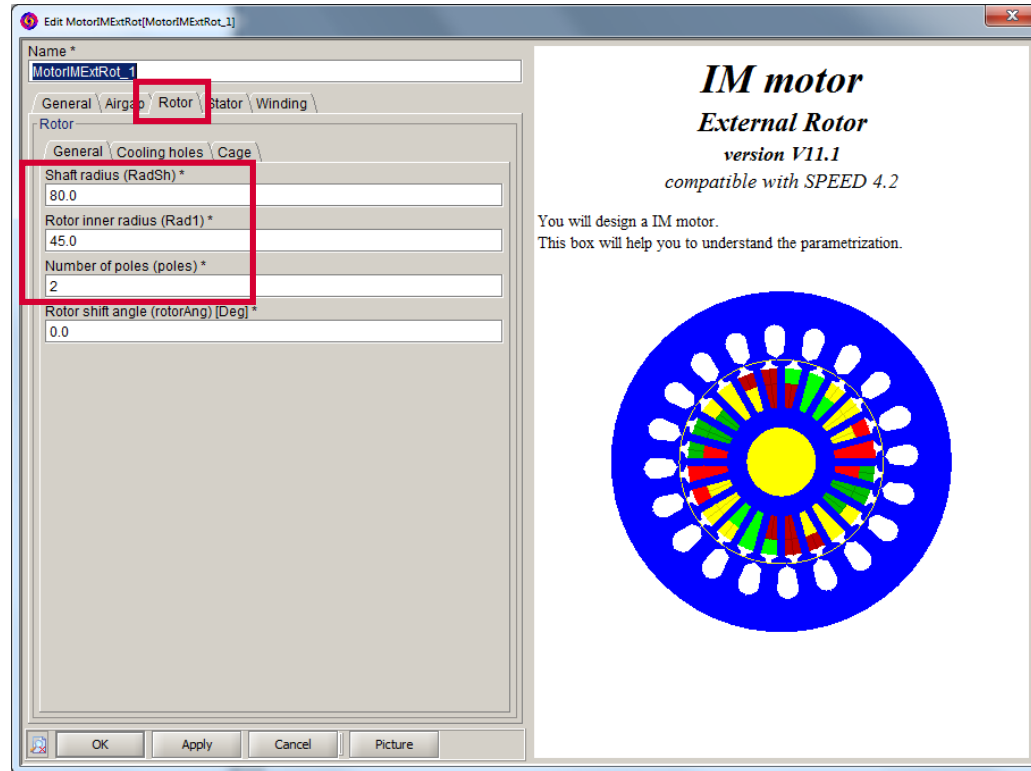- Load the Overlay "Induction_Motor_Outer_Rotor_V11.1.PFO", and create a new overlay

Building geometry and mesh with overlay

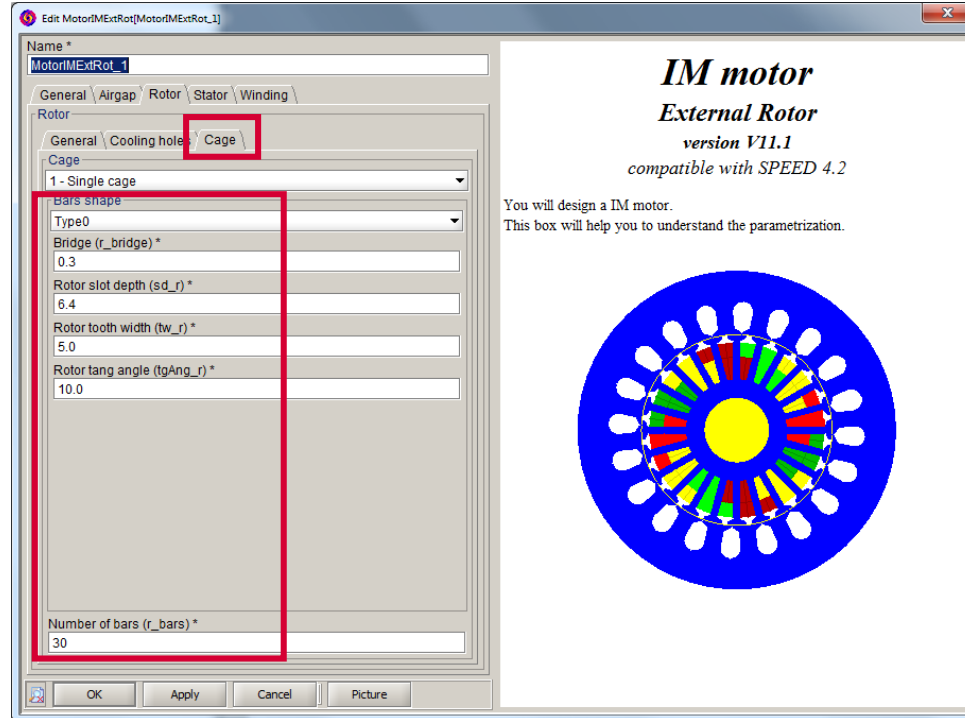# Building geometry and mesh with overlay

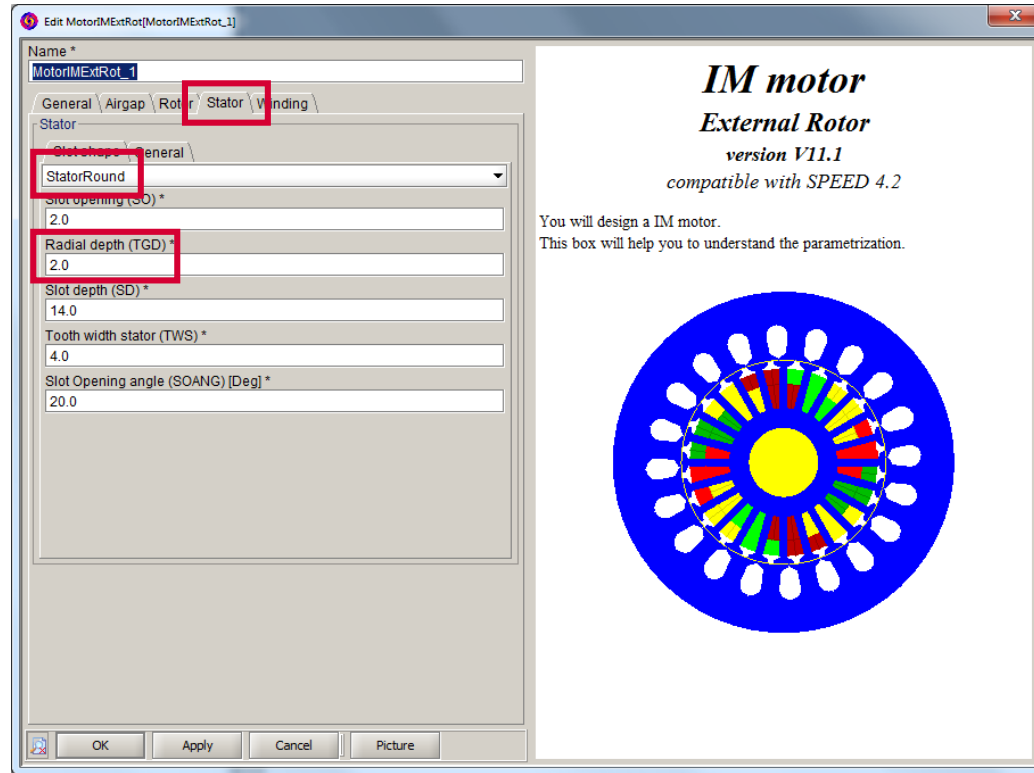# Building geometry and mesh with overlay

Building geometry and mesh with overlay
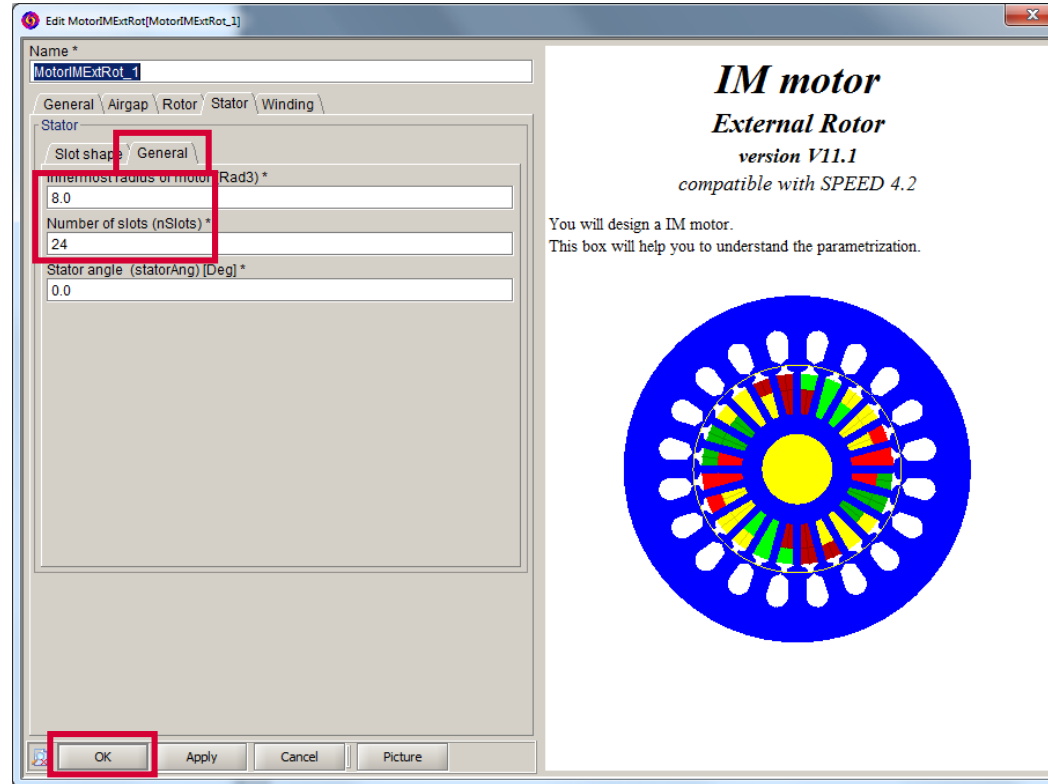
- Without cooling holes

Building geometry and mesh with overlay
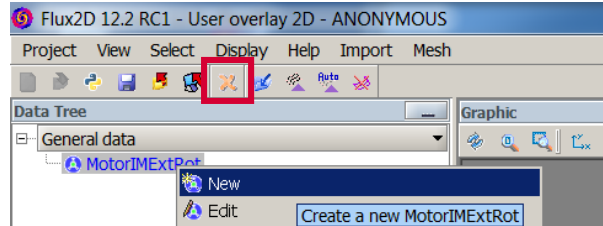
- Without cooling holes

Building geometry and mesh with overlay
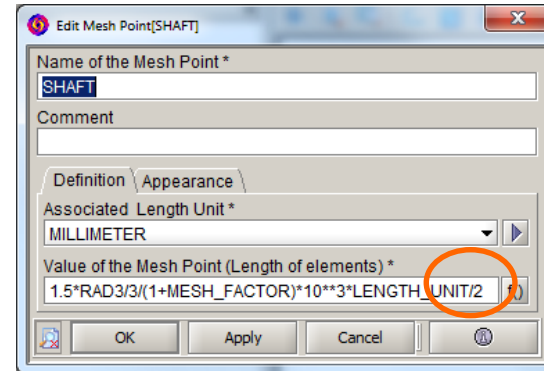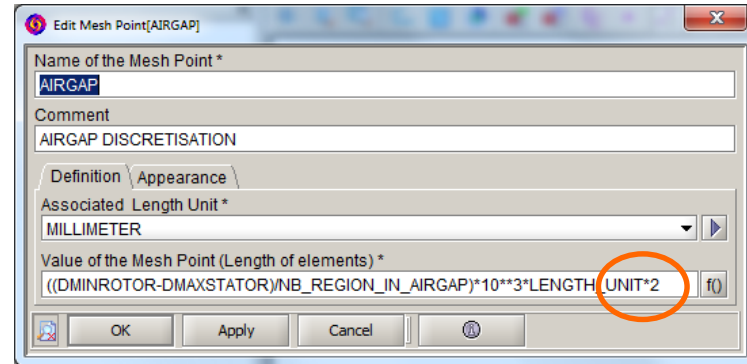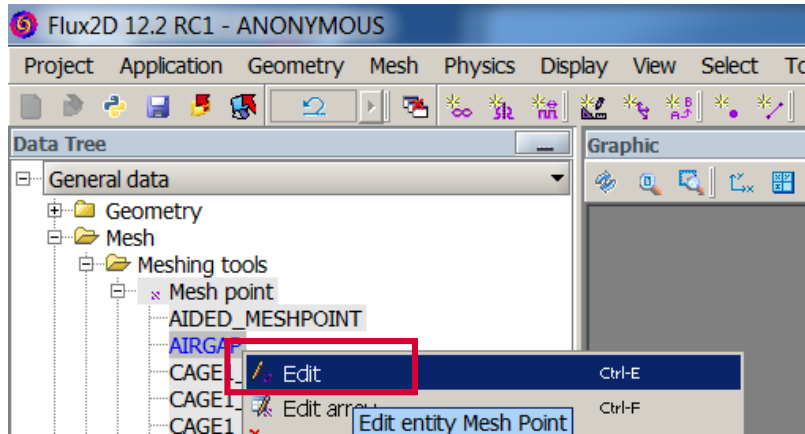
- No winding

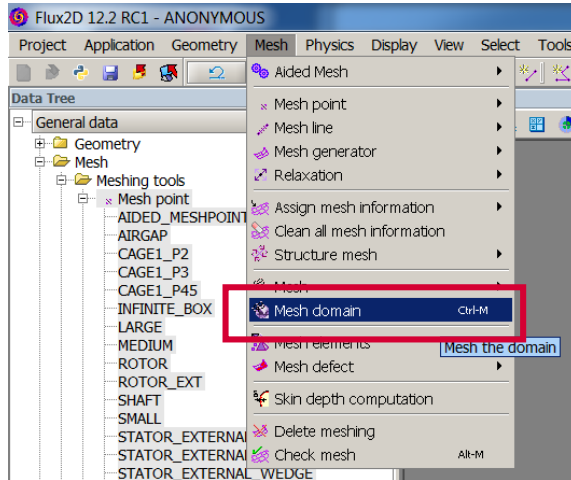# Building geometry and mesh with overlay

- Leave the overlay

Building geometry and mesh with overlay

- Edit meshpoints

Building geometry and mesh with overlay

- Mesh the geometry

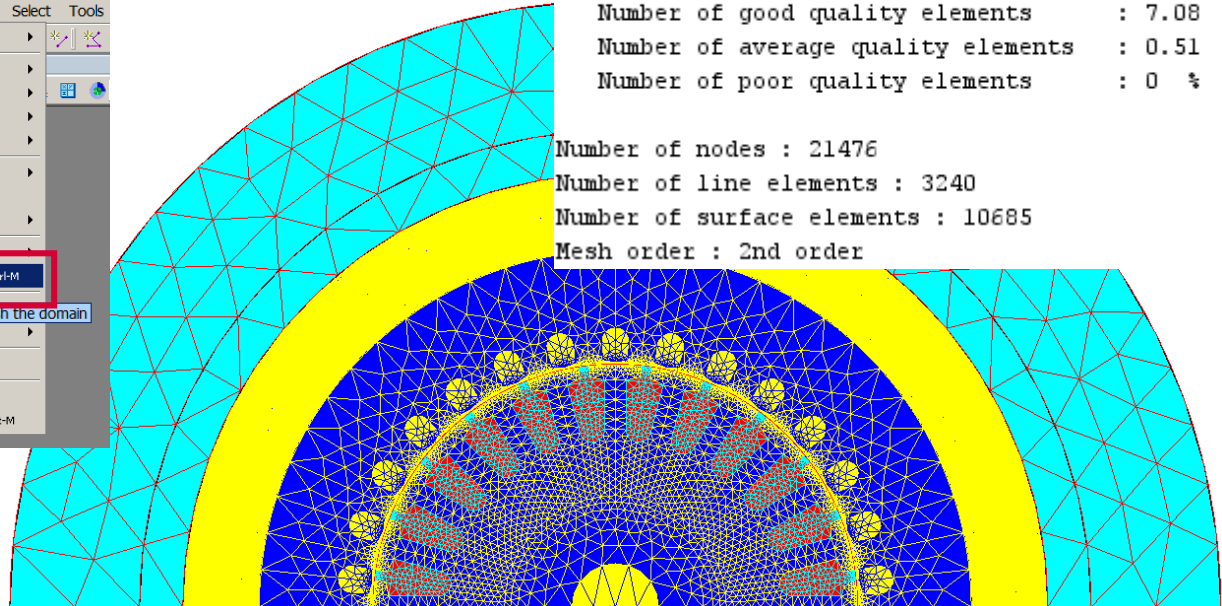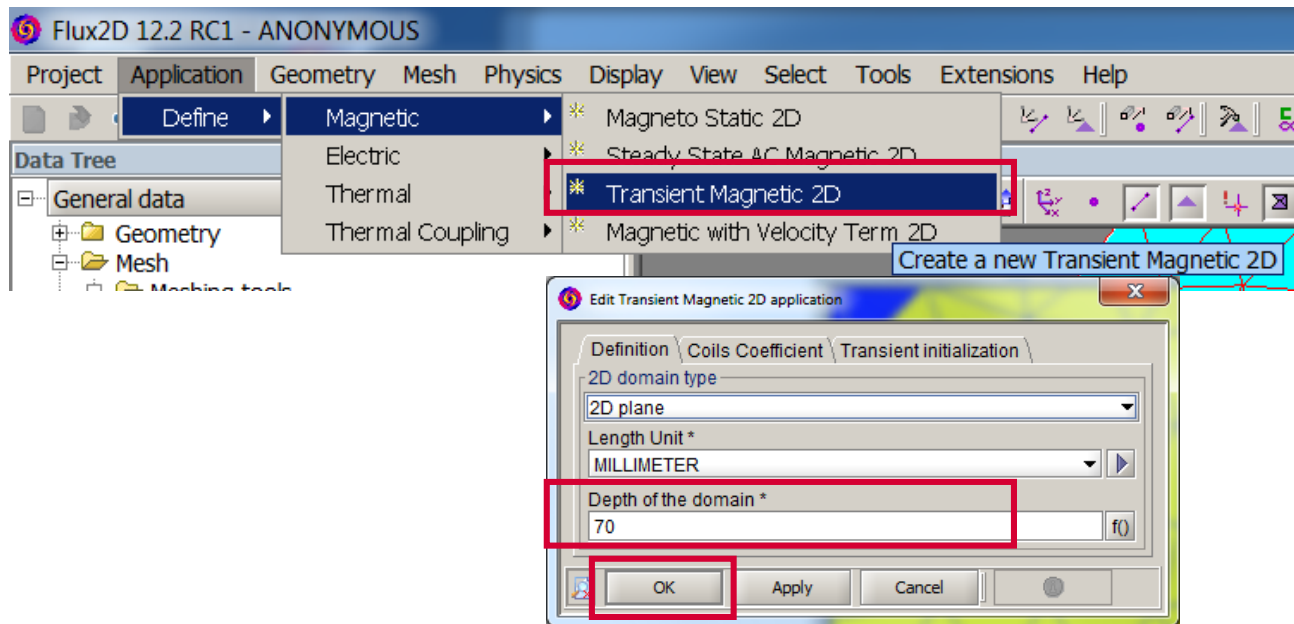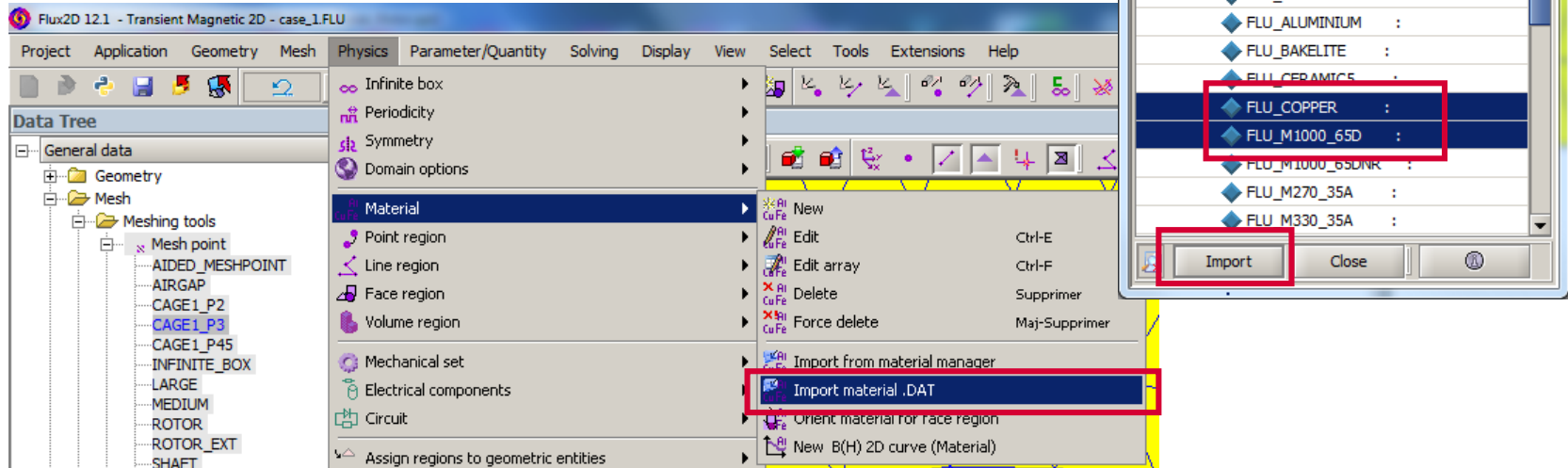- Save project as "Geomesh.FLU" [Project] [Save as]

Physics

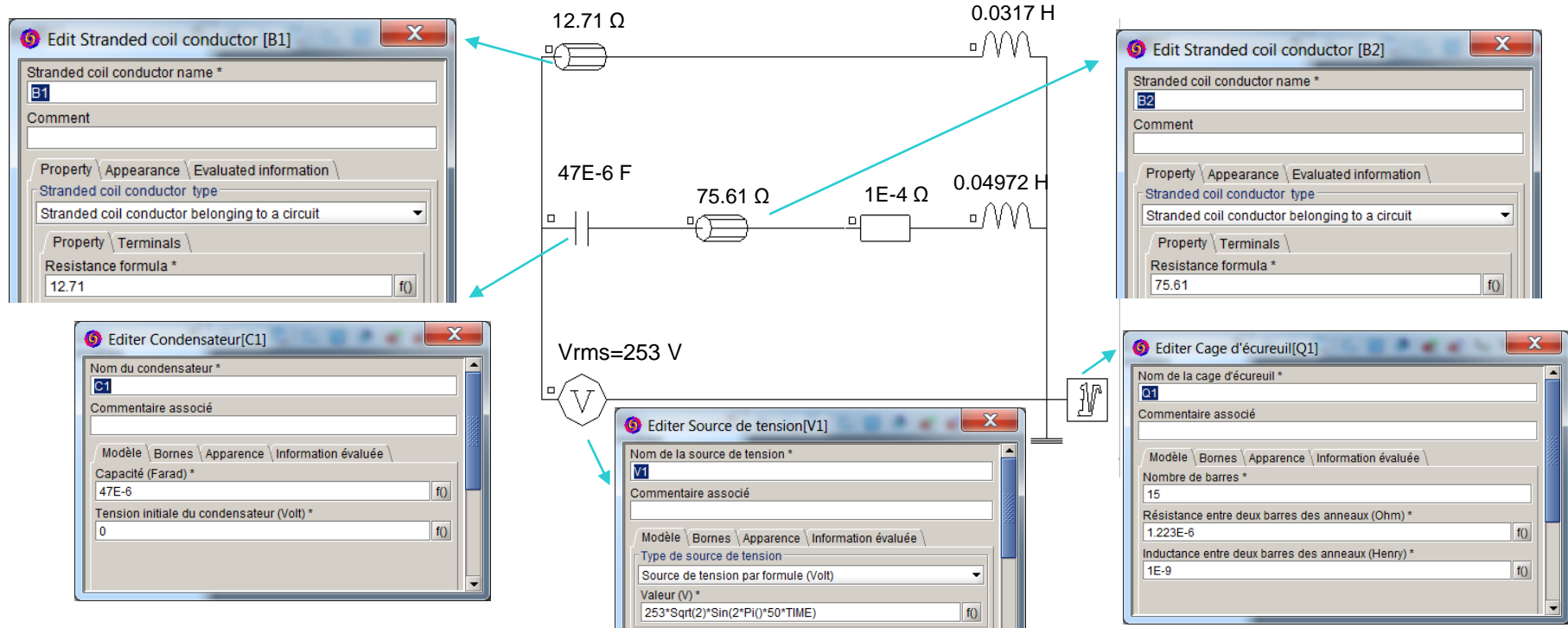- Create a transient magnetic application

Physics

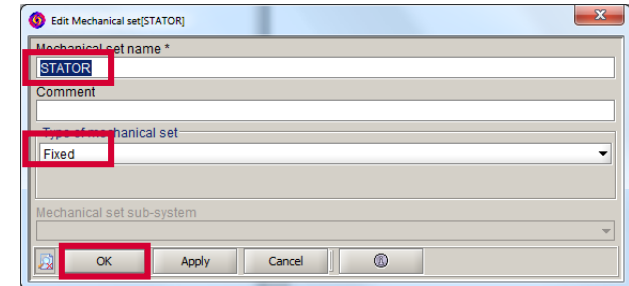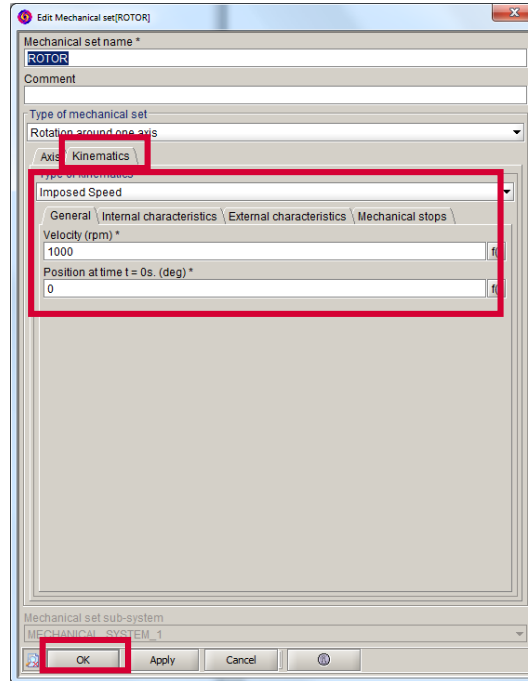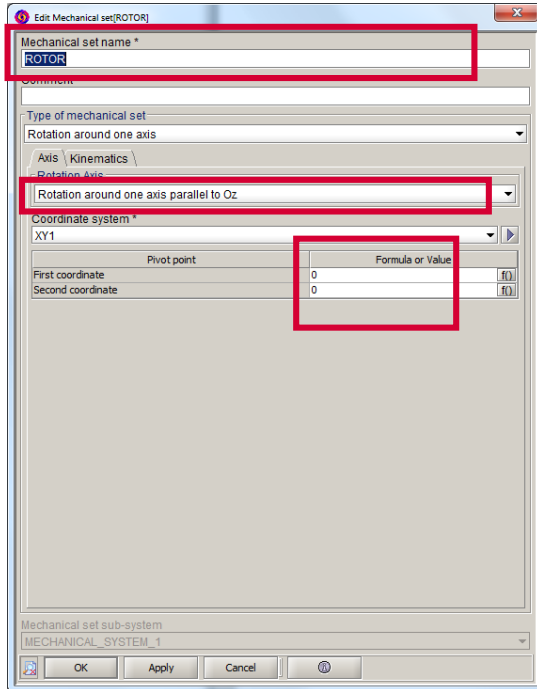- Import material

  - Flux_copper

  - Flux_M1000_65D

Physics

- Create an electric circuit [physics] [circuit] [circuit editor context]

Physics

- Create two mechanical sets for rotor and stator [Physics] [Mechanical set] [New]

Physics

- Edit the 15 regions of rotor bars [Physics] [Face region] [Edit Array] as following

Set a value in the first column to force it to all regions to edit

Physics

- Create 8 new face regions to describe the auxiliary phase [Physics] [Face region] [New] , as following

Edit Face region[AUX_M_1,AUX_M_2,AUX_M_3,AUX_M_4,AUX_P_1,AUX_P_2,AUX_P_3,AUX_P_4]

Entities	Modify all	AUX_M_1	AUX_M_2	AUX_M_3	AUX_M_4	AUX_P_1	AUX_P_2	AUX_P_3	AUX_P_4
Face region									
Name *		AUX_M_1	AUX_M_2	AUX_M_3	AUX_M_4	AUX_P_1	AUX_P_2	AUX_P_3	AUX_P_4
Comment	Initial values								
Transientmagnet *									
Sub types	Initial values	Coil cond...	Coil cond...	Coil cond...	Coil cond...	Coil cond...	Coil cond...	Coil cond...	Coil cond...
Coil conductor region		Coil cond...	Coil cond...	Coil cond...	Coil cond...	Coil cond...	Coil cond...	Coil cond...	Coil cond...
material	Initial values								
conductor *									
Component	Initial values	B2	B2	B2	B2	B2	B2	B2	B2
Turn number *	Initial values	105	92	72	59	105	92	72	59
Fill factor (0 < Cf < 1)	Initial values	false	false	false	false	false	false	false	false
Series or parallel *									
Sub types	All the symmetrical and periodical conductors are in series	All the sy...	All the sy...	All the sy...	All the sy...	All the sy...	All the sy...	All the sy...	All the sy...
All the symmetrical and periodical c		All the sy	All the sy	All the sy	All the sy	All the sy	All the sy	All the sy	All the sy
Sub types	Initial values	Negative ...	Negative ...	Negative ...	Negative ...	Positive o...	Positive o...	Positive o...	Positive o...
Positive orientation for the current						Positive o...	Positive o...	Positive o...	Positive o...
Negative orientation for the current		Negative	Negative	Negative	Negative				
Color *	Initial values	Green	Green	Green	Green	Green	Green	Green	Green
Visibility *	Initial values	VISIBLE	VISIBLE	VISIBLE	VISIBLE	VISIBLE	VISIBLE	VISIBLE	VISIBLE
Mechanical set	Initial values	STATOR	STATOR	STATOR	STATOR	STATOR	STATOR	STATOR	STATOR

OK   Apply   Cancel

Physics

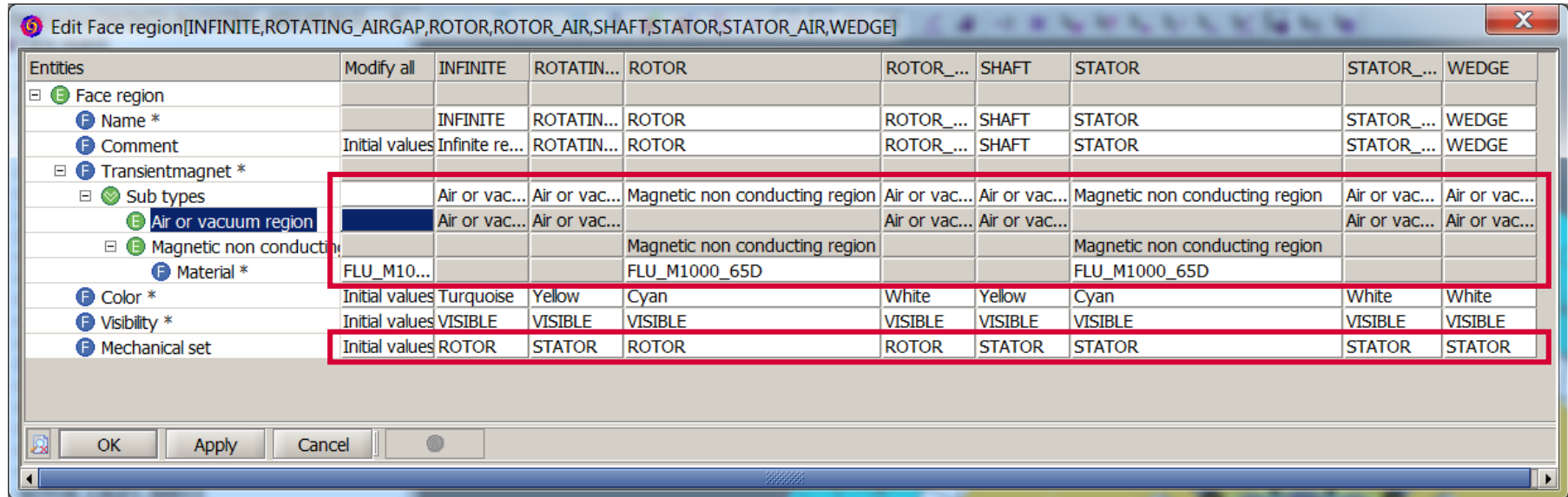- Create 4 new face regions to describe the main phase, as following:

Physics

- Edit the 8 following face regions to describe the other parts of the device, as following: [CTRL+Click on all face to edit][Rigth click on one of the selected faces] [Edit Array]
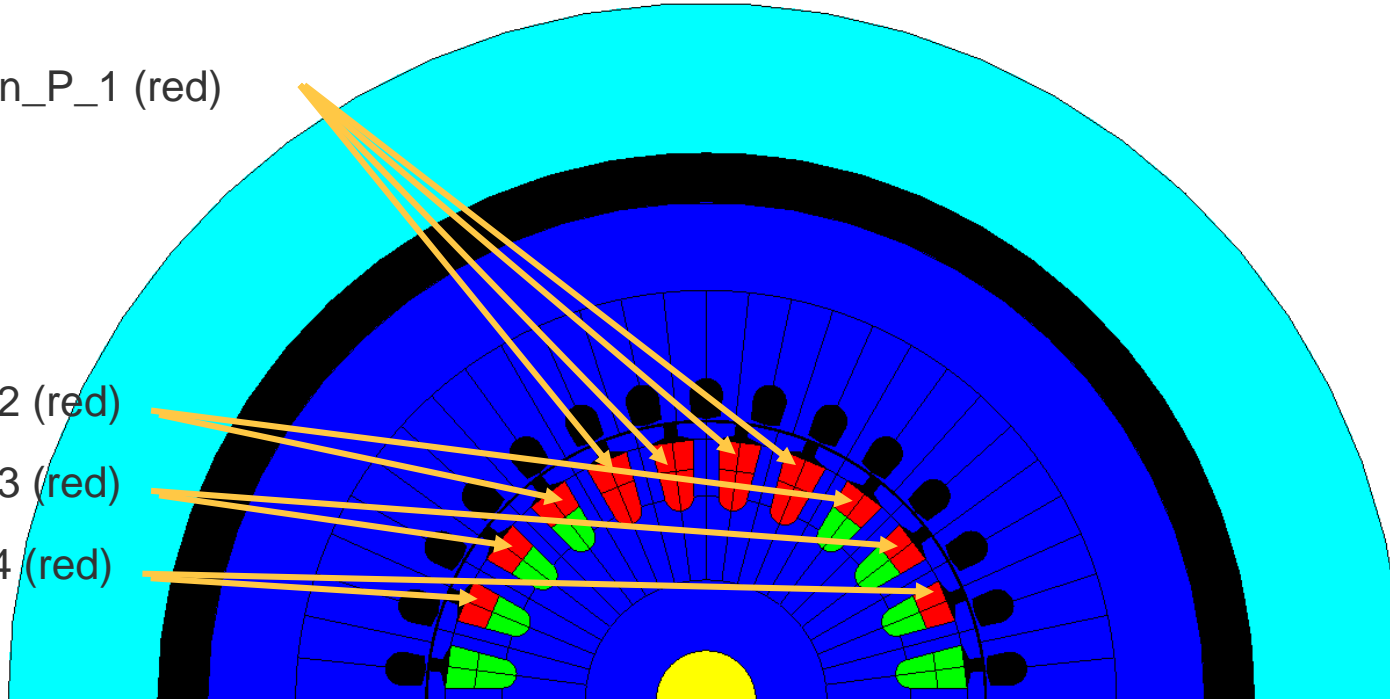
Physics

- Assign face region to face of the main phase [CTRL + click on all faces with the same face region to assign] [Right click on one of the selected region] [Edit] [Set the region in the corresponding tab]
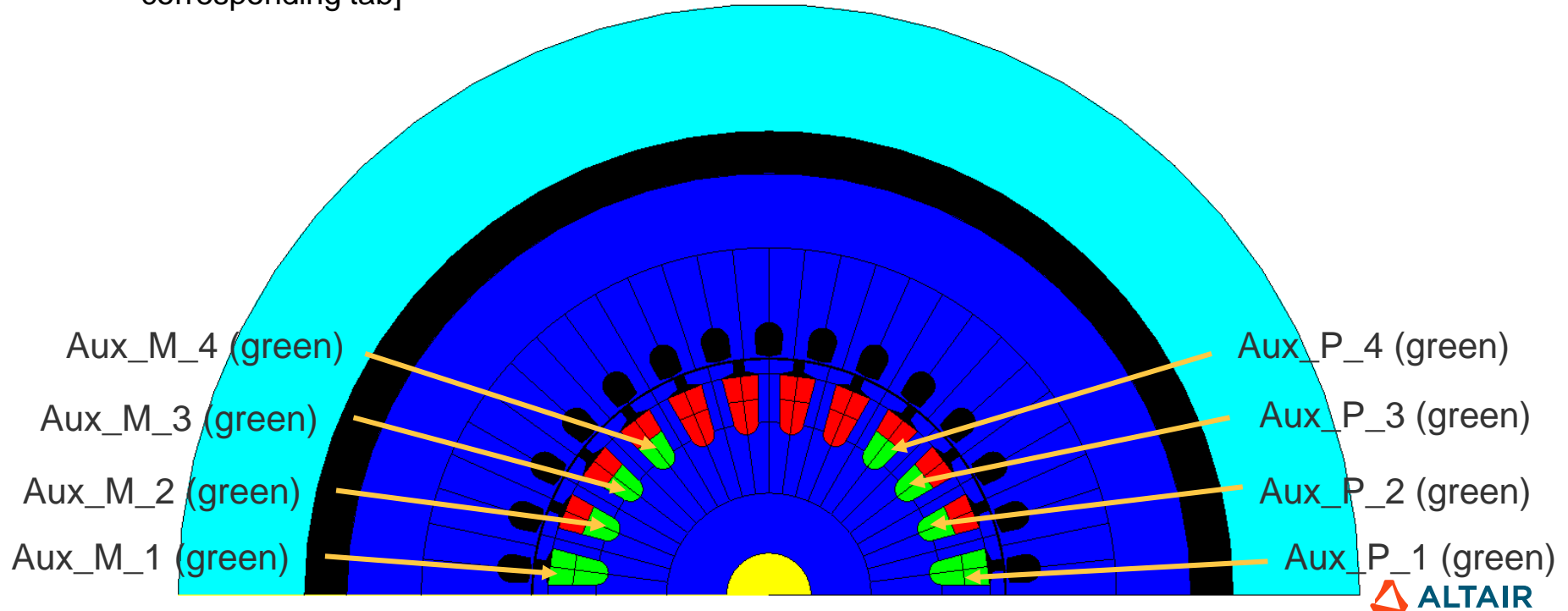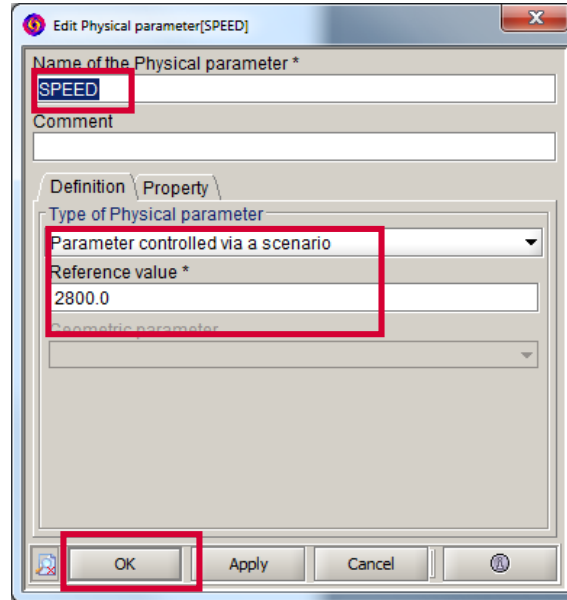
Physics

- Assign face region to face of the auxiliary phase [CTRL + click on all faces with the same face region to assign] [Right click on one of the selected region] [Edit] [Set the region in the corresponding tab]

Aux_M_4 (green)

Aux_M_3 (green)

Aux_M_2 (green)

Aux_M_1 (green)

Aux_P_4 (green)

Aux_P_3 (green)

Aux_P_2 (green)

Aux_P_1 (green)

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Physics

- Create a new I/O parameter for speed [Parameter/Quantity] [I/O Parameter] [New]

- Check Physic [Physics] [Check Physic]

- Save project as "Phys.FLU" [Project] [Save as]

Solving scenario

- Create a solving scenario [Solving] [Solving Scenario][New]
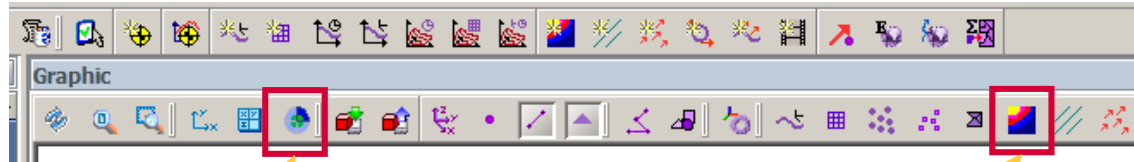
Solving scenario

Solving scenario

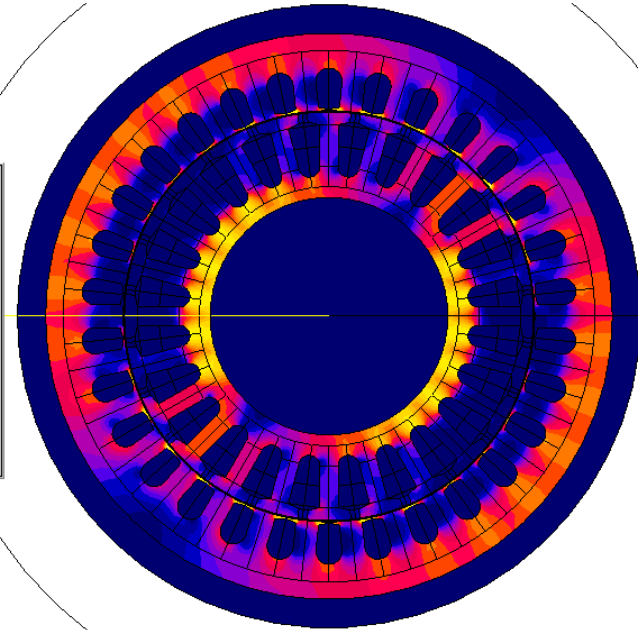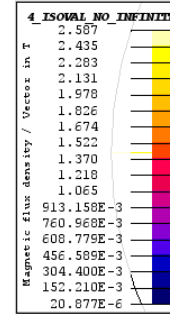- Create a solving scenario [Solving] [Solve]

Post-Processing

- Display a color shape for the magnetic Flux density

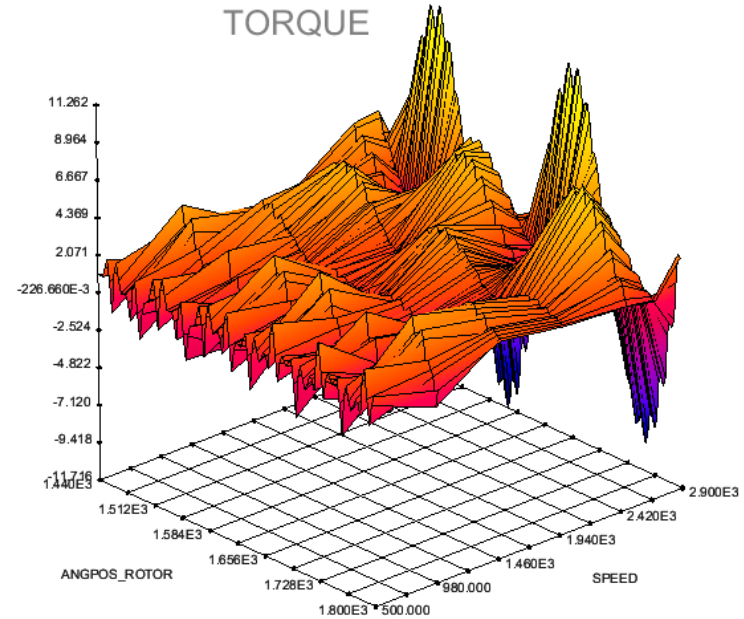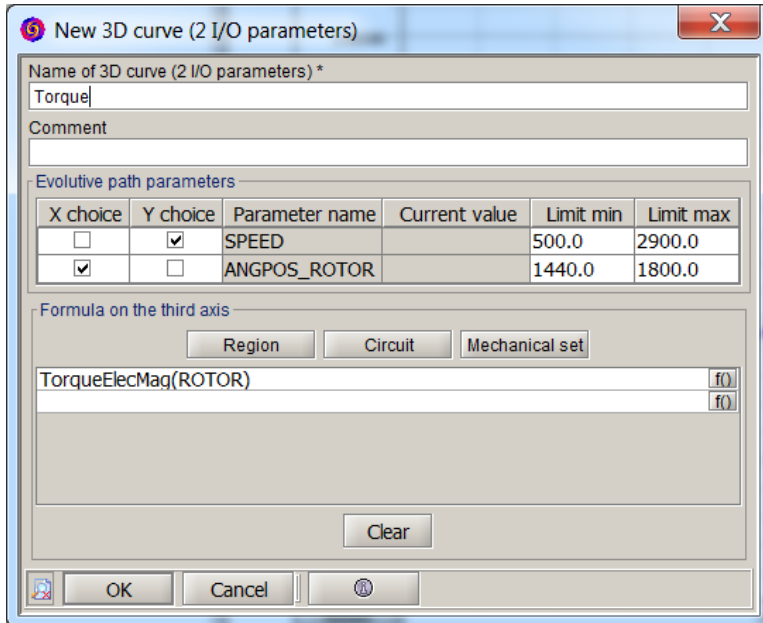Display all the device

Display magnetic flux density colorshade

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Post-Processing

- Create a 3D curve to display the torque versus angular position and speed [Curve] [3D curve (2 I/O parameters)] [New 3D curve (2 I/O parameters)]

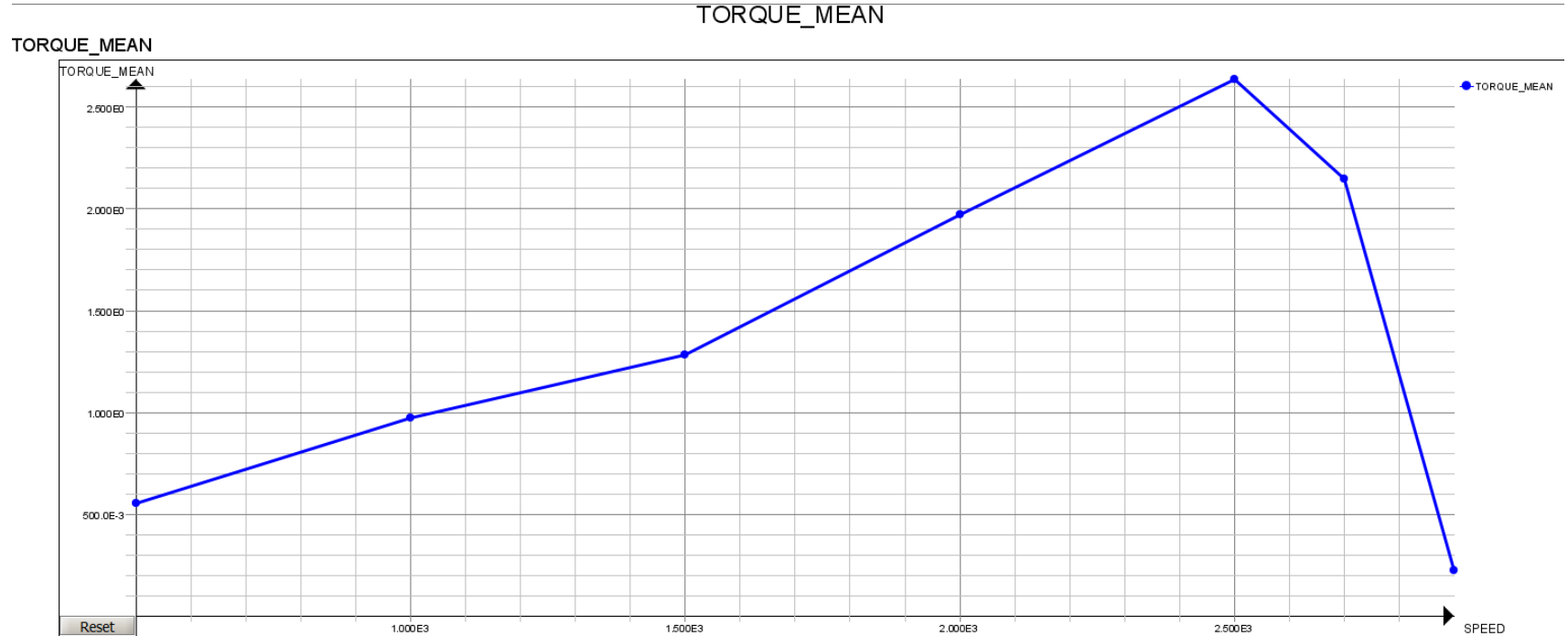 - Choose to display the electromagnetic torque

Post-Processing

- Create a 2D curve to display the mean value of the torque for each speed.

  - Load the macro "Extractfrom3Dcurve" [Project][Macro][Load]

  - Run the macro
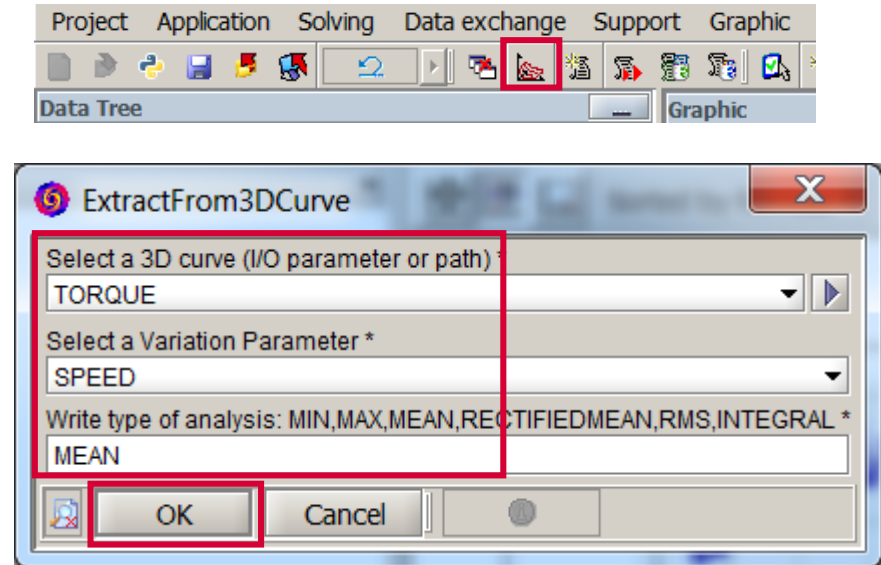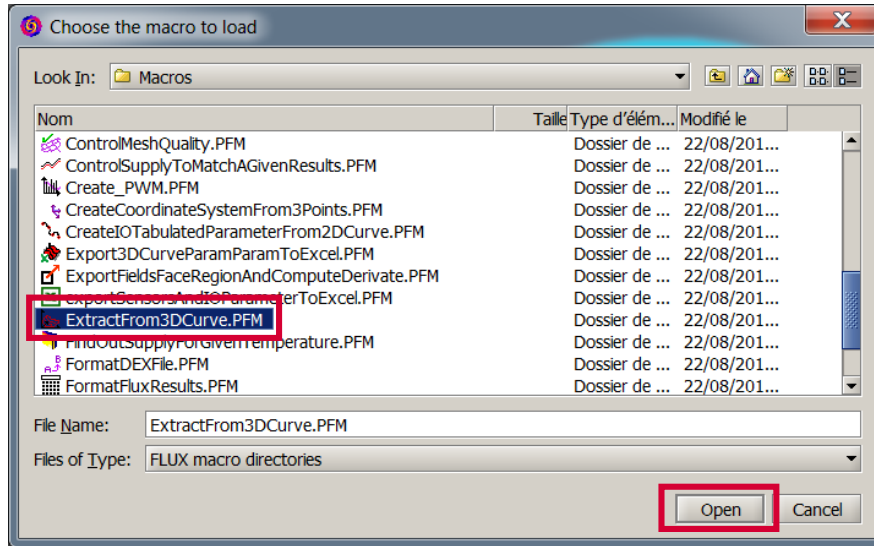
Post-Processing

- Results of the macro

TORQUE_MEAN

THANK YOU

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#ONLYFORWARD

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