

## CALCULATION OF ELECTRODYNAMIC FORCE WITH WINDINGS SHORT-CIRCUIT IN POWER TRANSFORMER

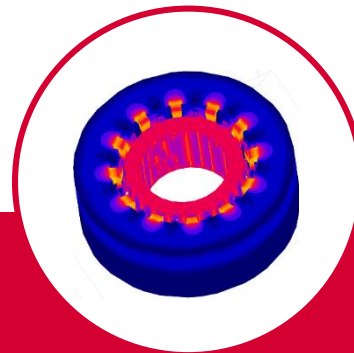
Flux 3D

# THE BEST-IN-CLASS TOOL FOR ELECTROMAGNETIC SIMULATION

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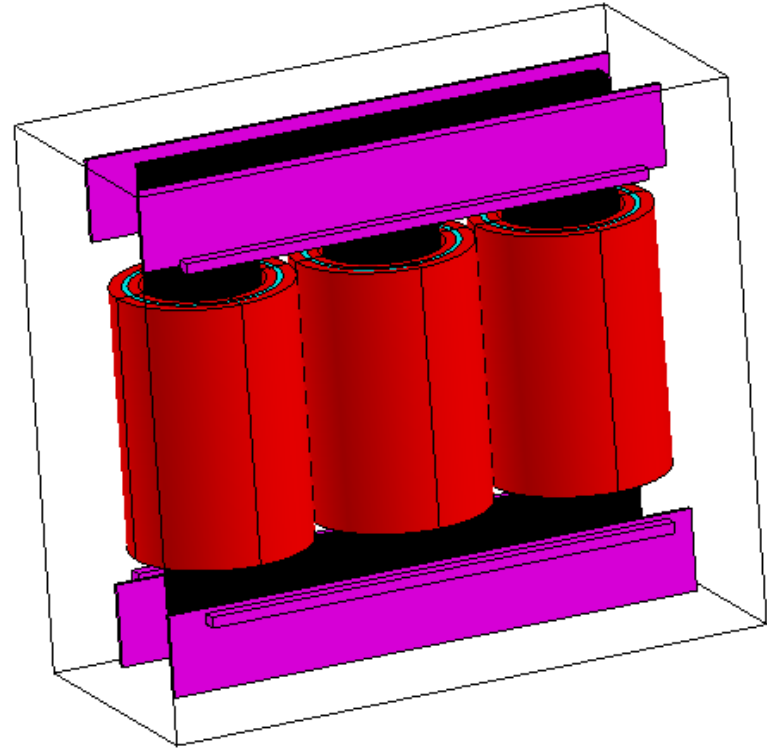
# Summary

Geometry and physics

Solving

Post processing

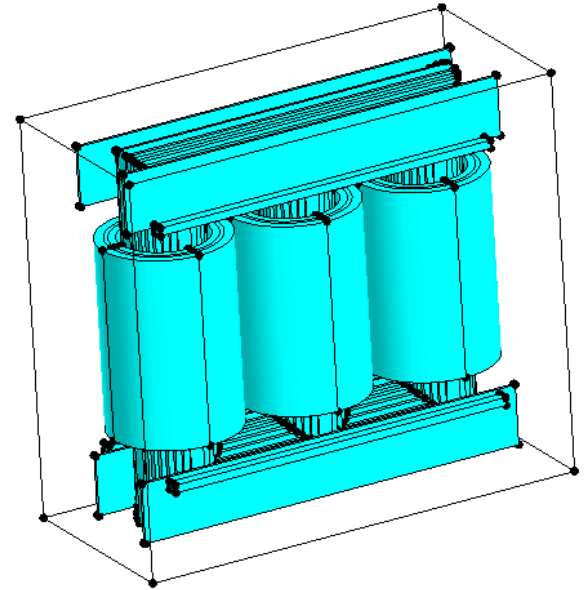
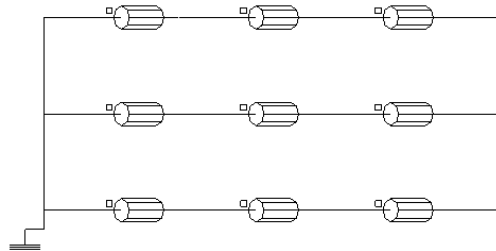
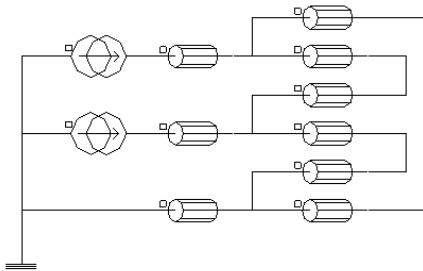
- Force computation



# Geometry and physics

Execute the python script:

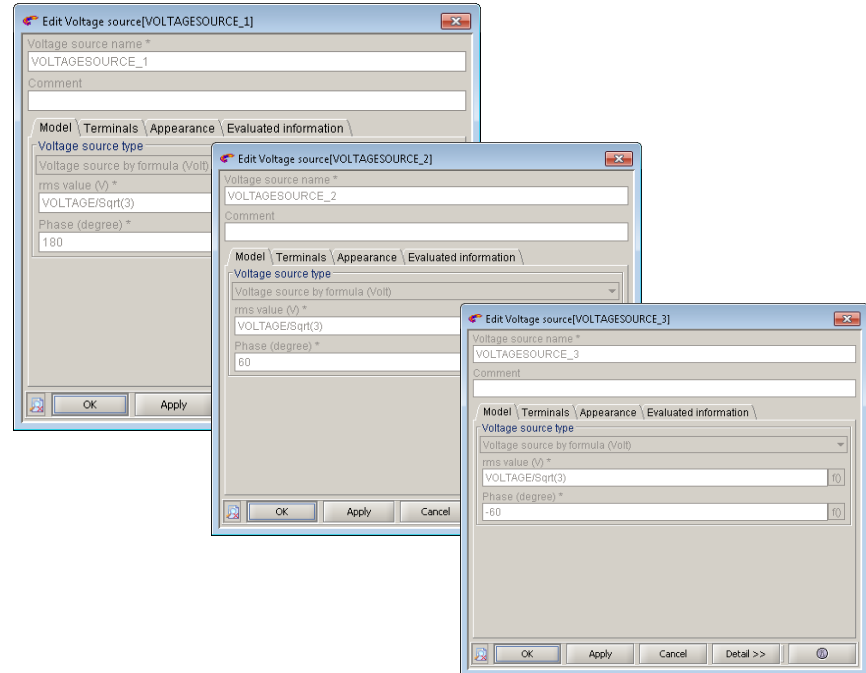
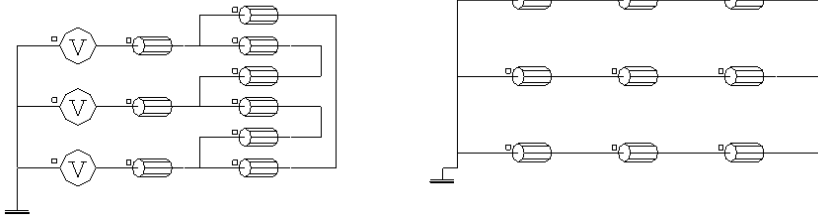
- buildGeomesh.py
- buildPhys.py



# Geometry and physics

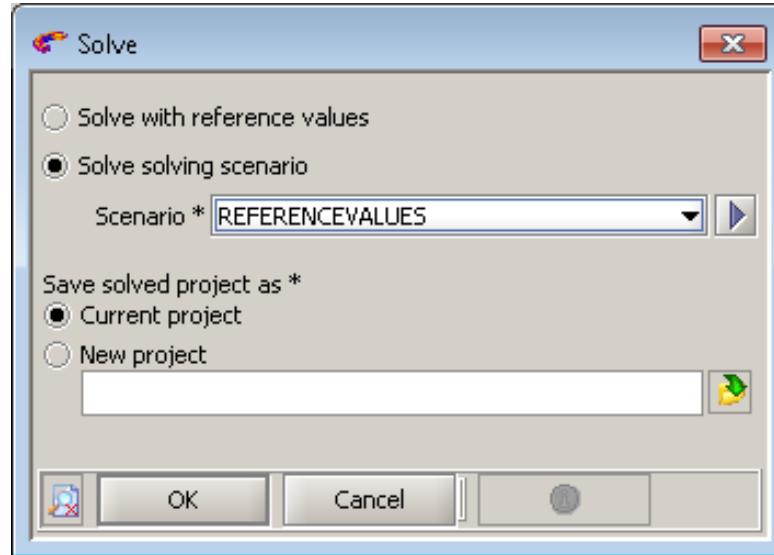
To make the short circuit test we impose the nominal voltage and let Flux compute the short circuit current

To do it we need to modify the circuit

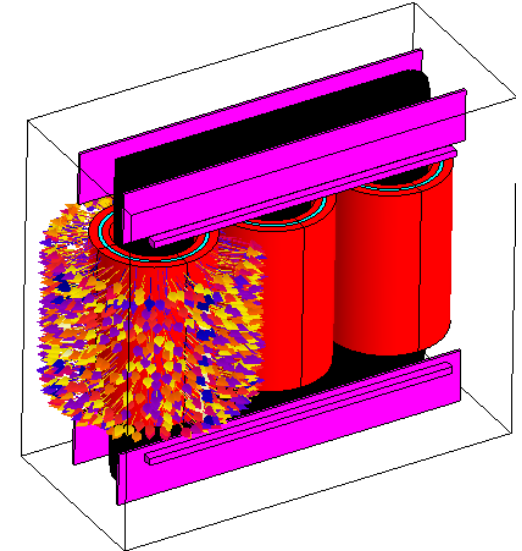
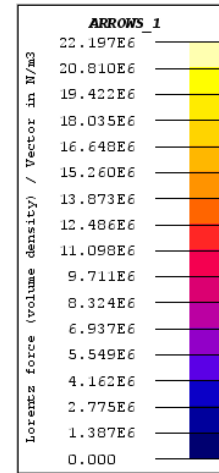
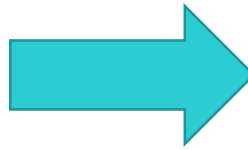
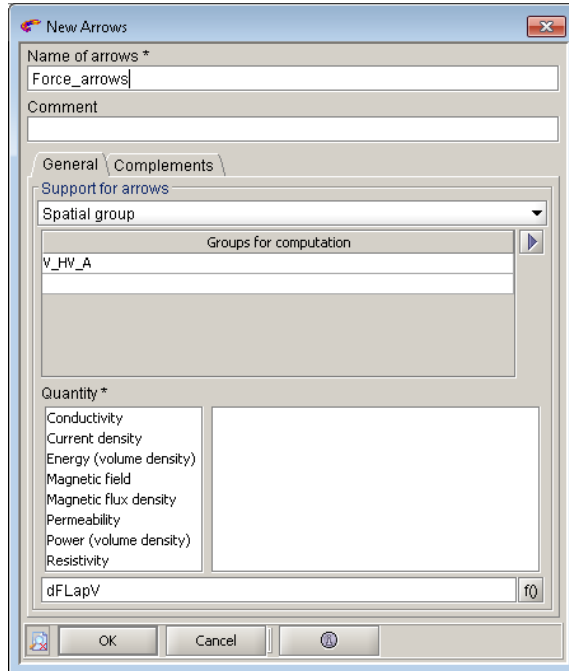


# Solving

We solve the project with the reference value



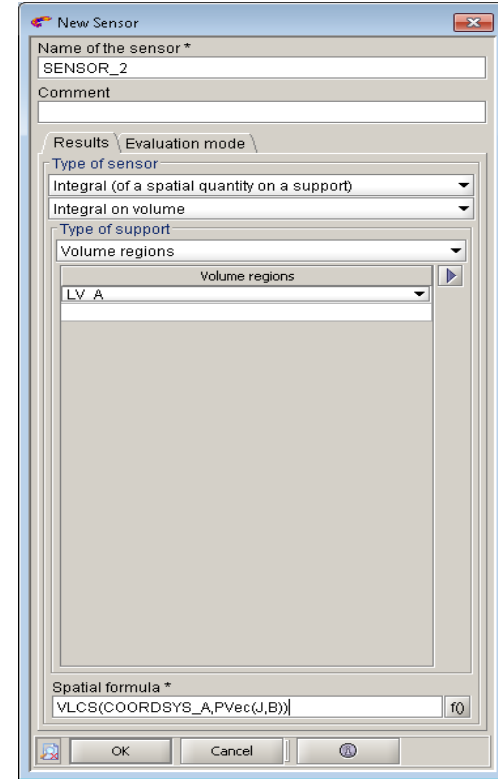
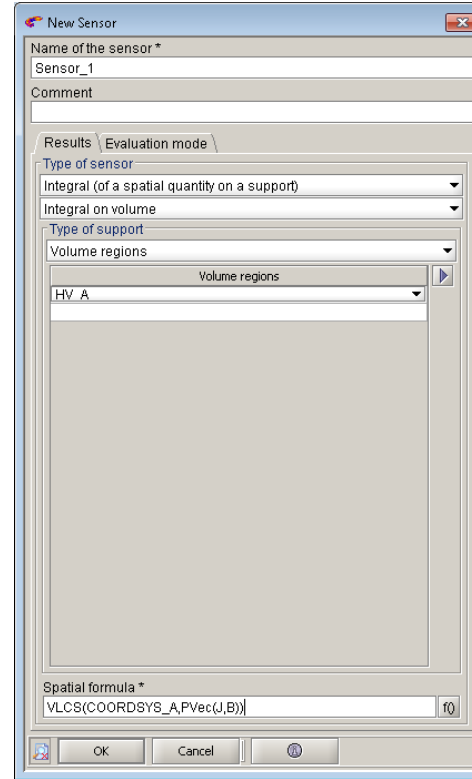
# Post processing



# Post processing

To compute the electromagnetic force:

- Create sensors
- We use a cylindrical coordinate system
- Evaluate sensors





# Post processing

## Electromagnetic force:

- Component 1: radial force
- Component 2: tangential force
- Component 3: force in Z axis

**Edit Result[HVA]**

Name of the result \*  
HVA

Comment  
Current value of SENSOR\_1

Validity of the result  
Valid result

Results \ Description \

Complex vectorial

Components	Real part	Imaginary part	Complex modulus	Phase
Component 1	-7361690.142082262	-1.4462772129469942E7	1.6228563073082093E7	-2.041625625956084
Component 2	-1.469922403169558E-11	-3.276873686468395E-11	3.591458342847476E-11	-1.9924642824396077
Component 3	-5840.129873021958	1242.6573119820857	5970.8721413865505	2.931940278004541

General modulus  
1.6228564171494588E7

OK Apply Cancel Detail >>

**Edit Result[LVA]**

Name of the result \*  
LVA

Comment  
Current value of SENSOR\_2

Validity of the result  
Valid result

Results \ Description \

Complex vectorial

Components	Real part	Imaginary part	Complex modulus	Phase
Component 1	6256083.907505492	1.227247390600106...	1.377505722787481...	1.0993668657842566
Component 2	2.277893148143039...	4.413064428567506...	4.966279779175239...	1.0942962568547567
Component 3	6182.967709633433	-1644.8798987892326	6398.024662332162	-0.26001167521302...

General modulus  
1.3775058713702304E7

OK Apply Cancel Detail >>



# THANK YOU

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