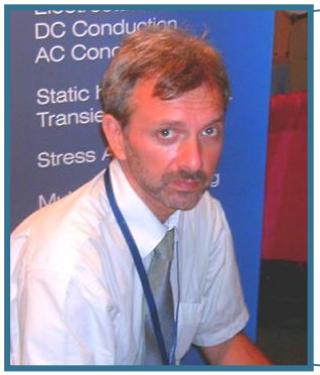
What's new in QuickField 6.2



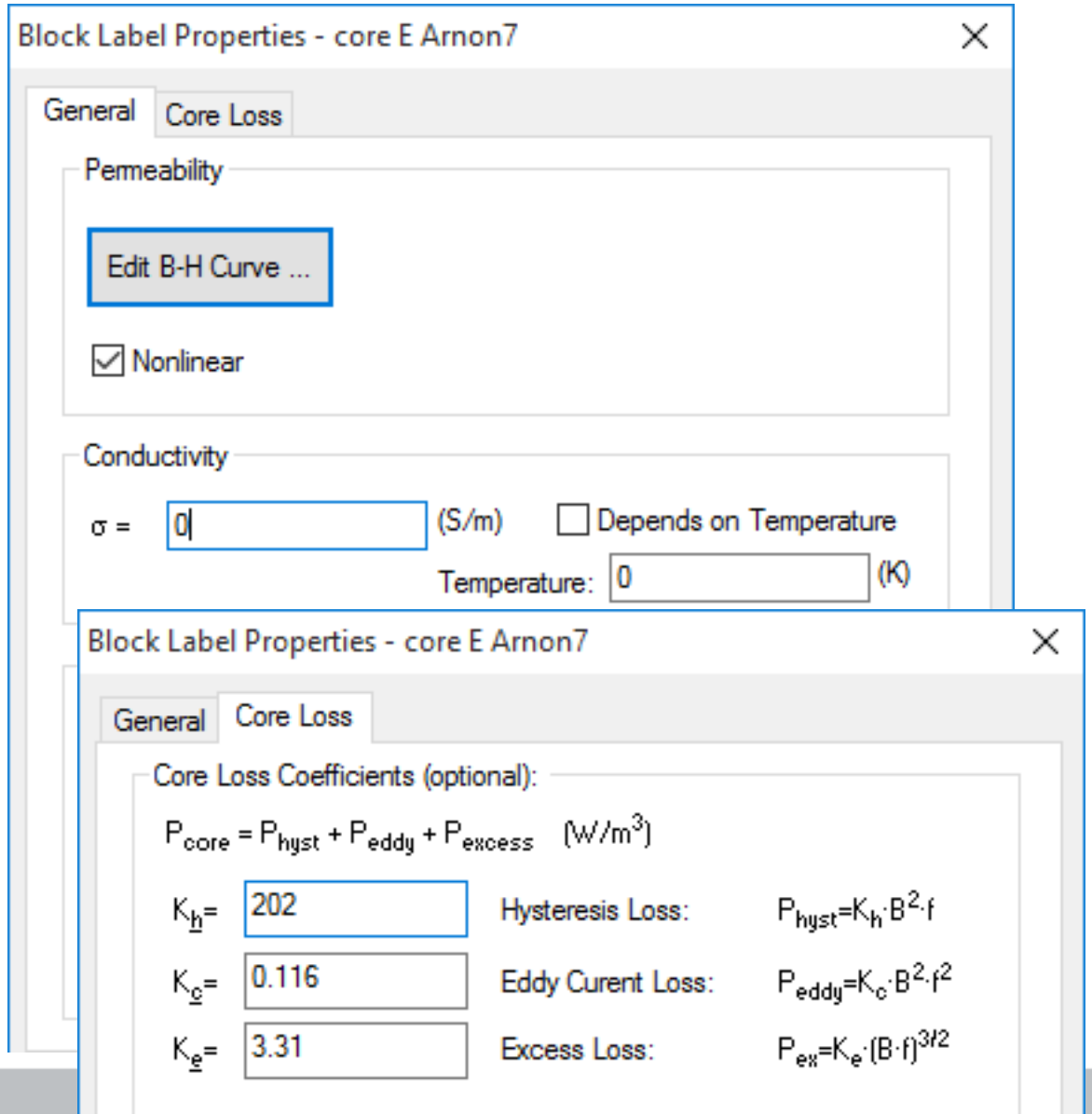
Vladimir Podnos,
Director of Marketing and Support,
Tera Analysis Ltd.
New features overview

Alexander Lyubimtsev
Support Engineer,
Tera Analysis Ltd.
QuickField live demonstration

What’s new in QuickField 6.2

- 3D DC Conduction
- 3D Heat transfer
- Core iron losses calculation (2D AC magnetics)

Core iron losses



$$P_{hyst} = k_h \cdot f \cdot B_m^2$$

$$+$$

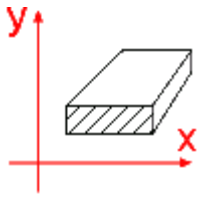
$$P_{eddy} = k_c \cdot f^2 \cdot B_m^2$$

$$+$$

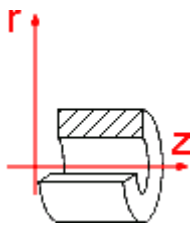
$$P_{excess} = k_e \cdot (f \cdot B_m)^{3/2}$$

QuickField: before 6.0

Magnetic analysis suite	
Magnetic Problems	2D Magnetostatics
	2D AC Magnetics
	2D Transient Magnetics
Electric analysis suite	
Electric Problems	2D Electrostatics and 2D DC Conduction
	2D AC Conduction
	Transient 2D Electric field
Thermostructural analysis suite	
Thermal and mechanical problems	Steady-State 2D Heat transfer
	Transient 2D Heat transfer
	2D Stress analysis



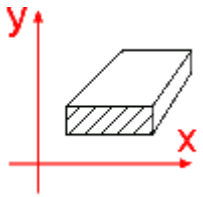
plane-parallel



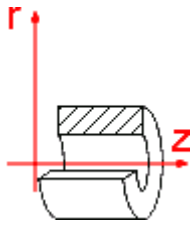
axisymmetric

QuickField 6.0

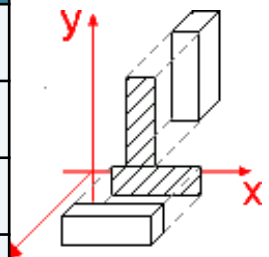
Magnetic analysis suite	
Magnetic Problems	2D Magnetostatics
	2D AC Magnetics
	2D Transient Magnetics
Electric analysis suite	
Electric Problems	2D Electrostatics and 2D DC Conduction
	3D Extrusion Electrostatics free preview
	2D AC Conduction
	Transient 2D Electric field
Thermostructural analysis suite	
Thermal and mechanical problems	Steady-State 2D Heat transfer
	Transient 2D Heat transfer
	2D Stress analysis



plane-parallel



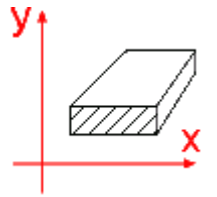
axisymmetric



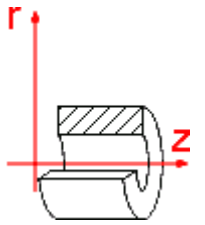
3D extrusion

QuickField 6.1

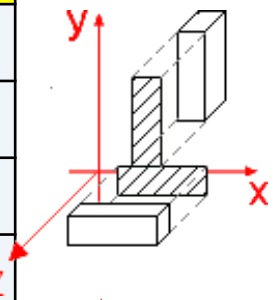
Magnetic analysis suite	
Magnetic Problems	2D Magnetostatics
	2D AC Magnetics
	2D Transient Magnetics
Electric analysis suite	
Electric Problems	2D Electrostatics and 2D DC Conduction
	3D Extrusion + 3D CAD Import Electrostatics
	2D AC Conduction
	Transient 2D Electric field
Thermostructural analysis suite	
Thermal and mechanical problems	Steady-State 2D Heat transfer
	Transient 2D Heat transfer
	2D Stress analysis



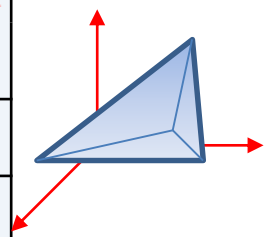
plane-parallel



axisymmetric



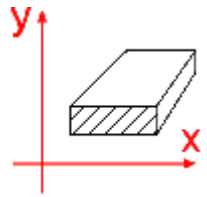
3D extrusion



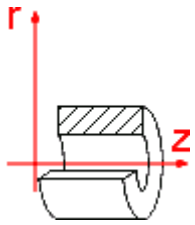
3D import

QuickField 6.2

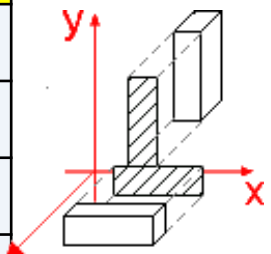
Magnetic analysis suite	
Magnetic Problems	2D Magnetostatics
	2D AC Magnetics
	2D Transient Magnetics
Electric analysis suite	
Electric Problems	2D Electrostatics and 2D DC Conduction
	3D Electrostatics + 3D DC Conduction
	2D AC Conduction
	Transient 2D Electric field
Thermostructural analysis suite	
Thermal and mechanical problems	Steady-State 2D Heat transfer
	Steady-State 3D Heat transfer
	Transient 2D Heat transfer
	2D Stress analysis



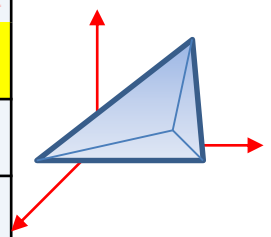
plane-parallel



axisymmetric



3D extrusion



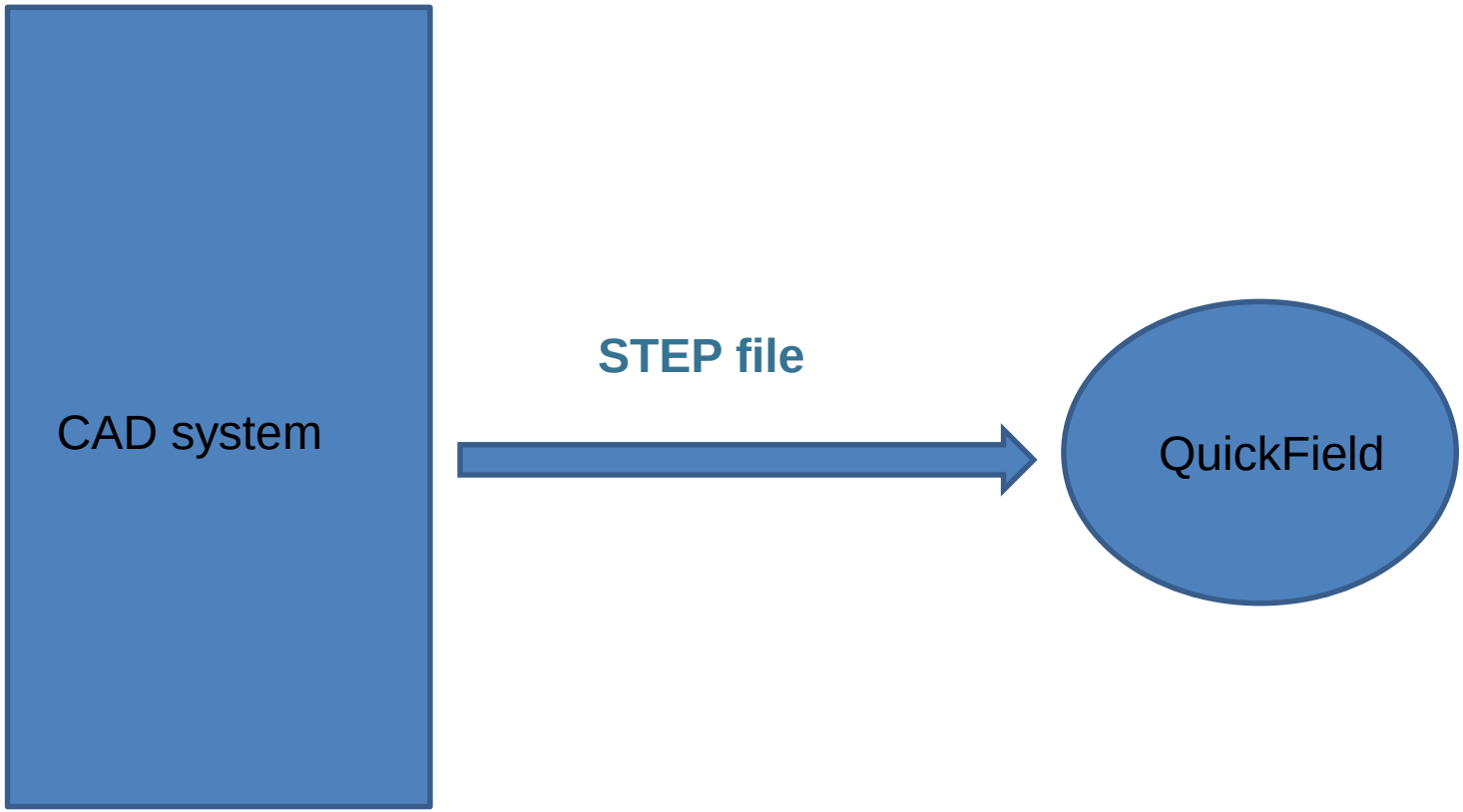
3D import

3D geometry types

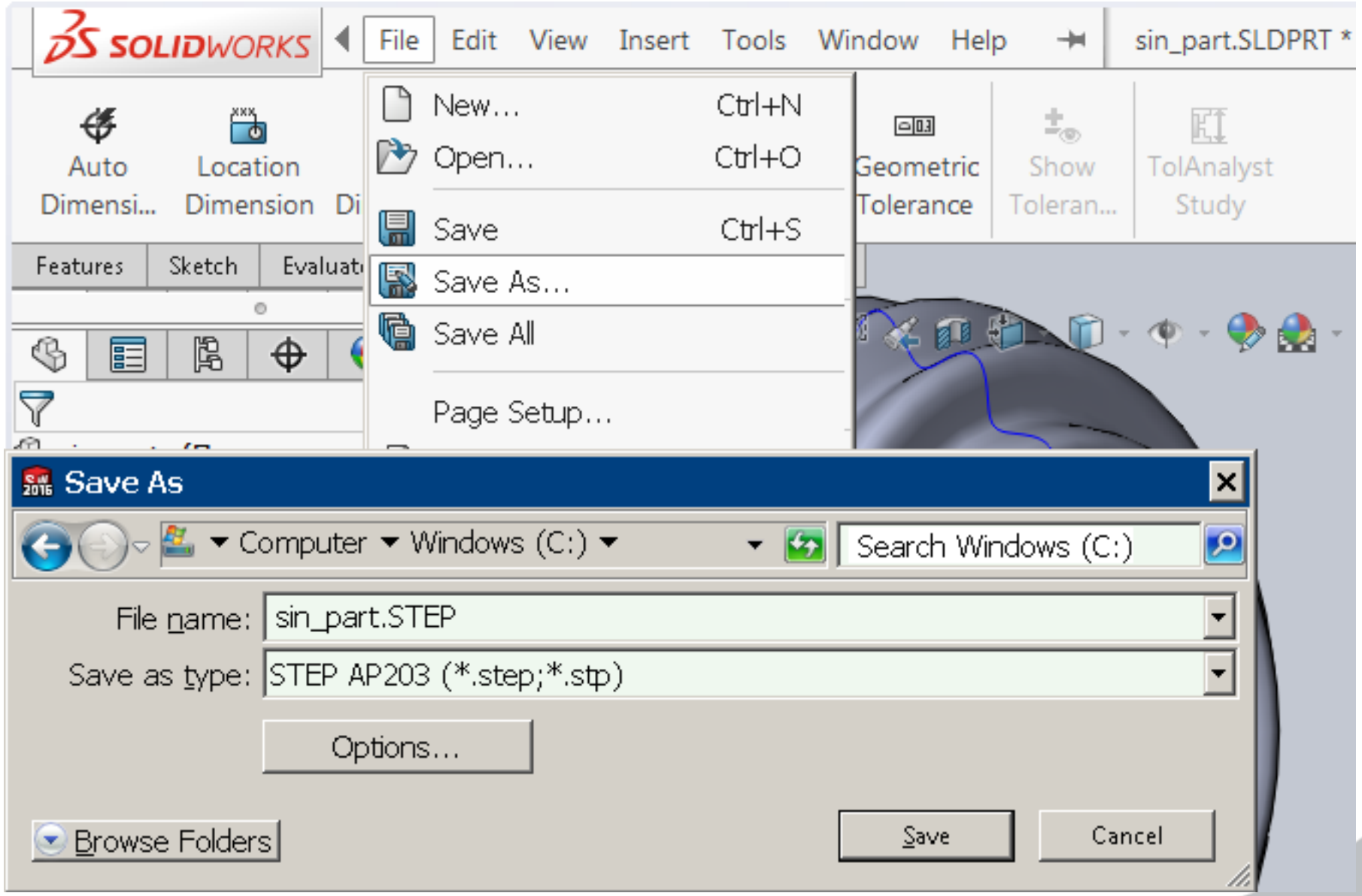
Can be extruded

Can not be extruded

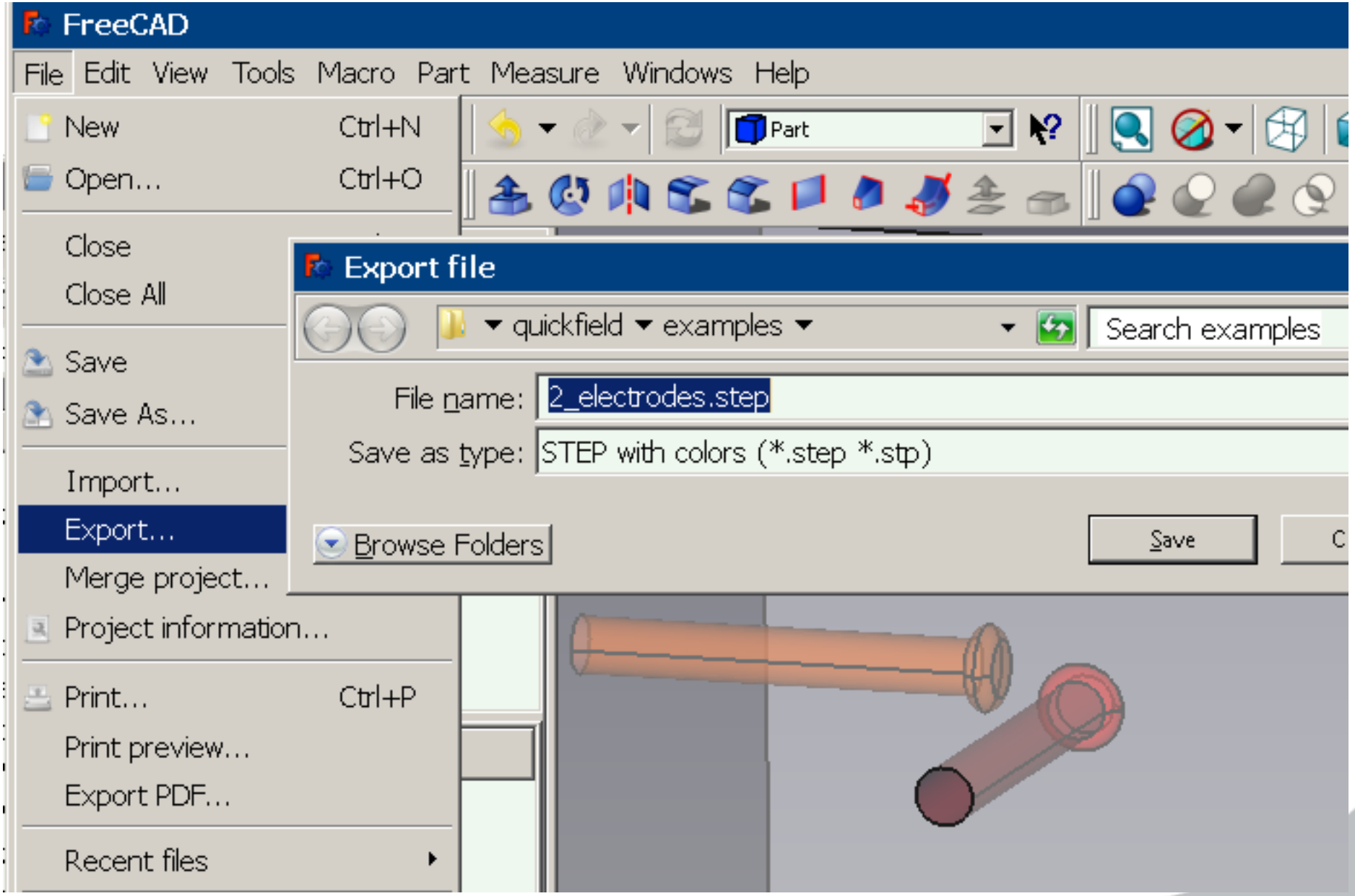
3D CAD model import



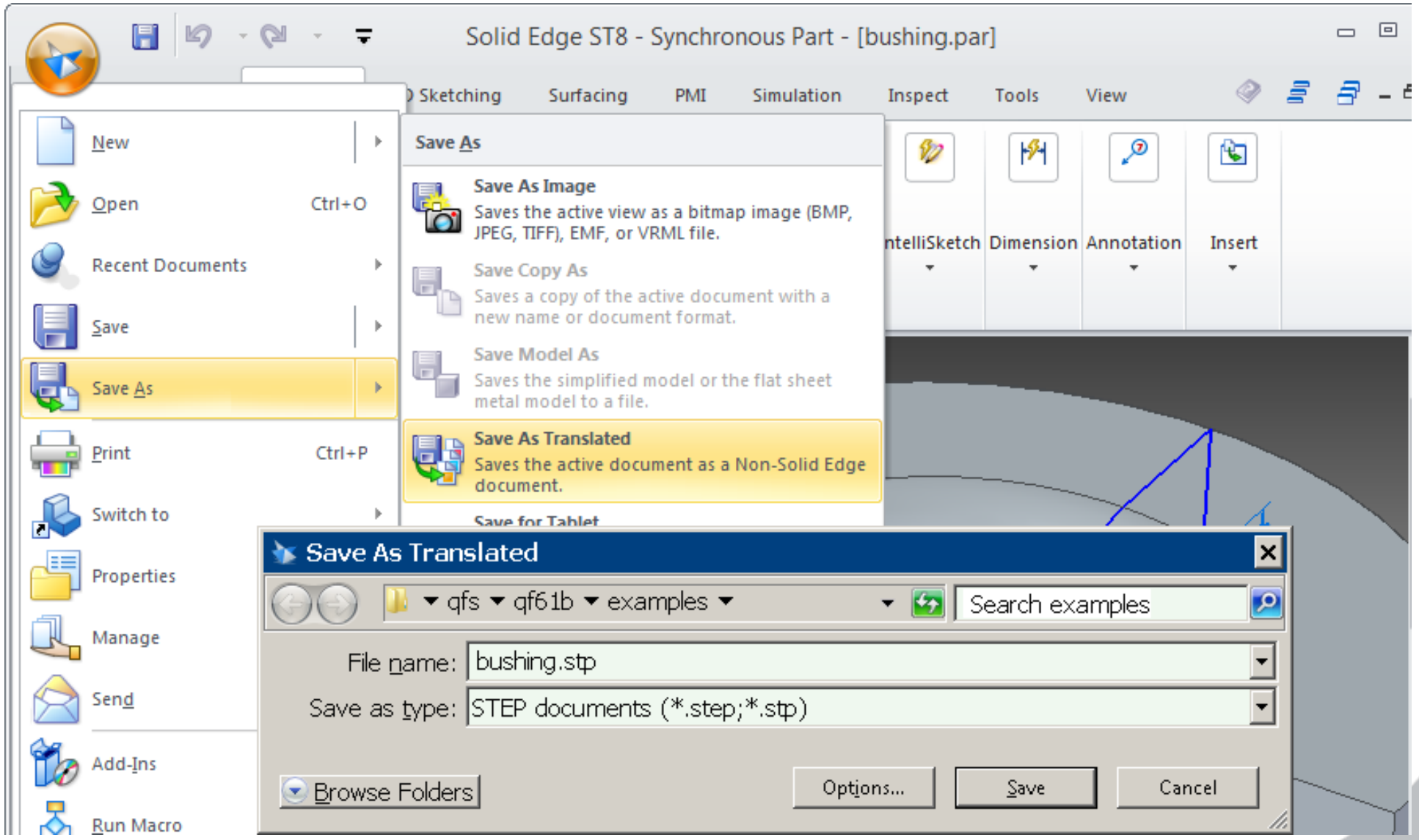
STEP file export from SOLIDWORKS



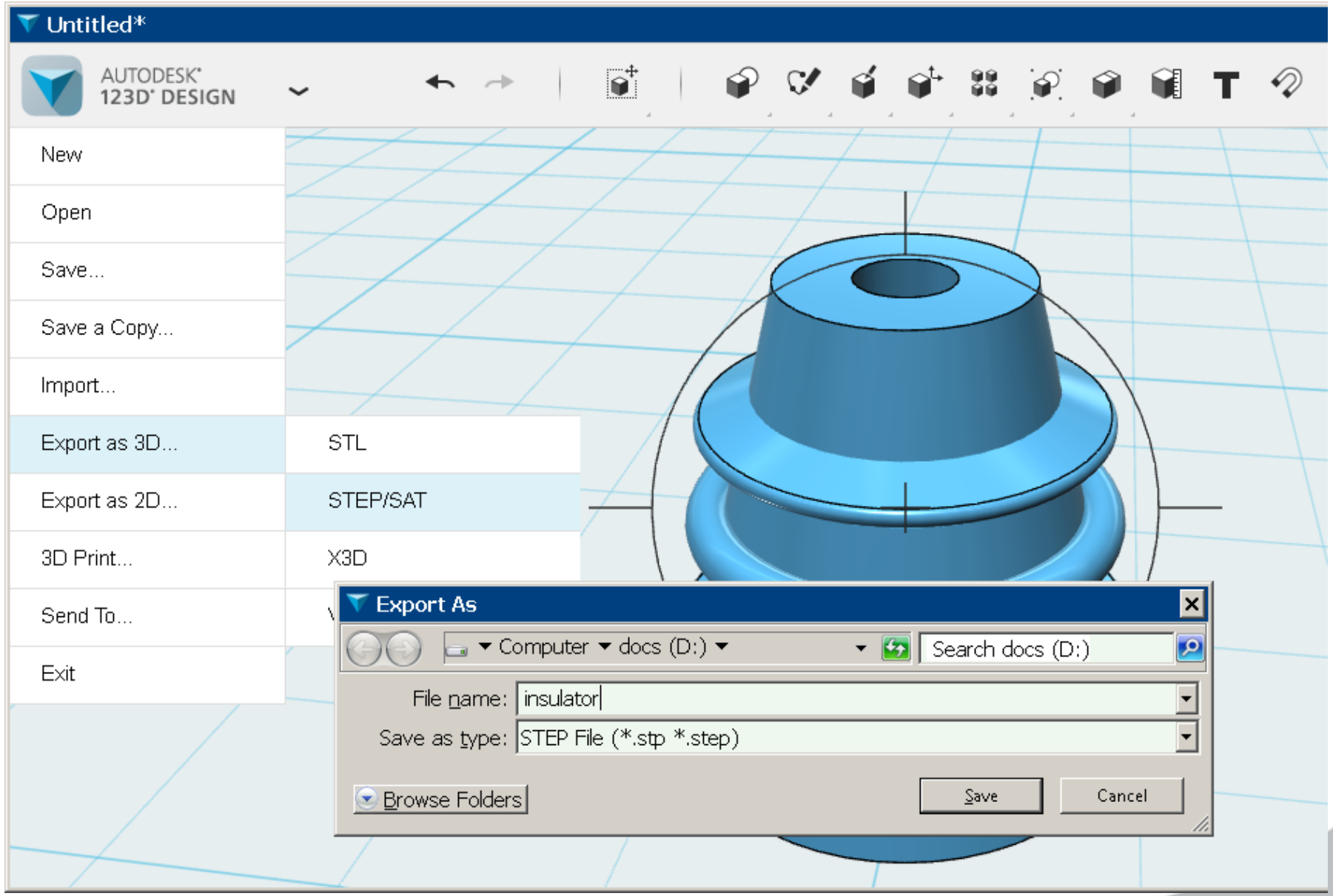
STEP file export from FreeCAD



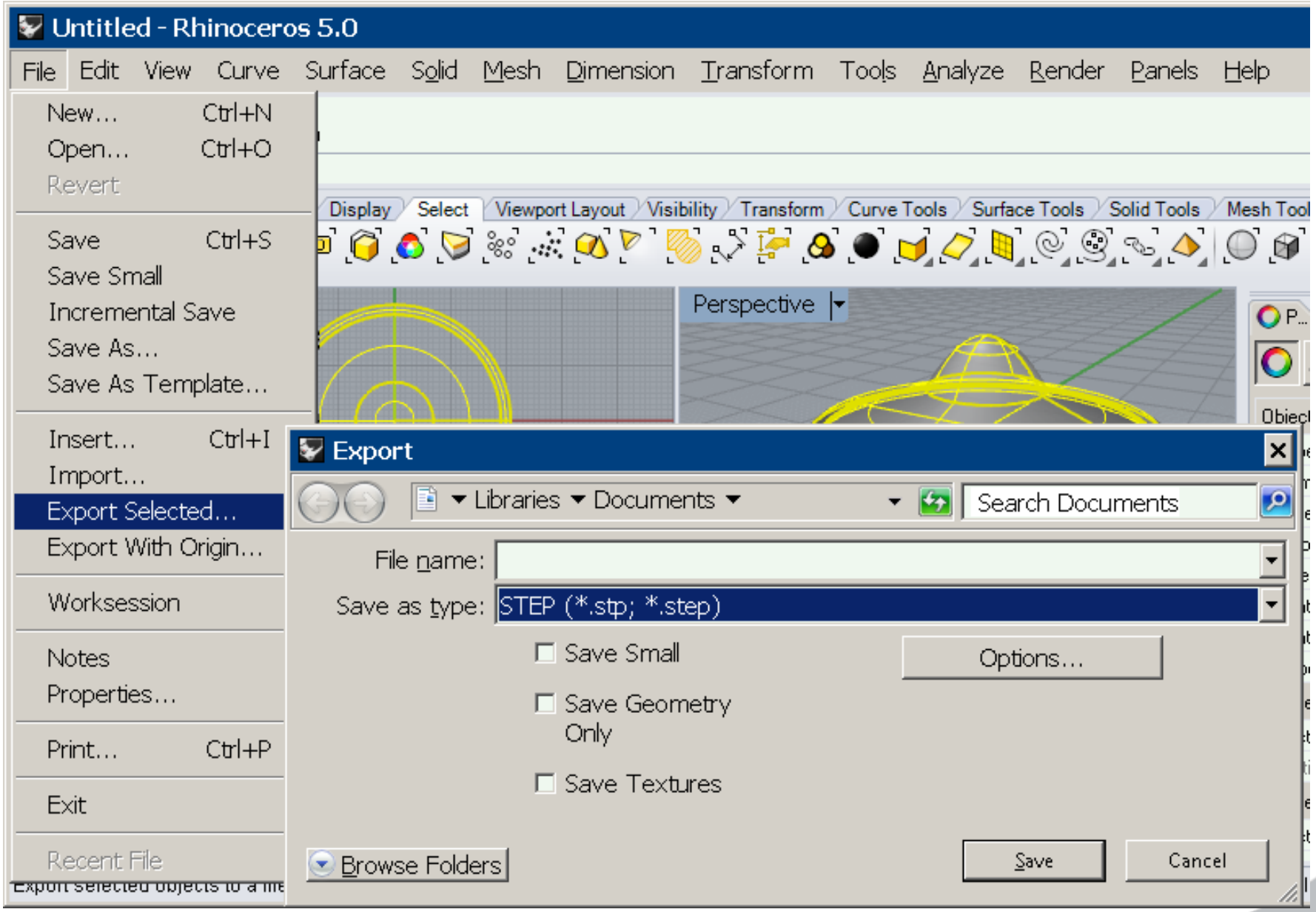
STEP file export from Solid Edge



STEP file export from AutoDesk 123D' Design

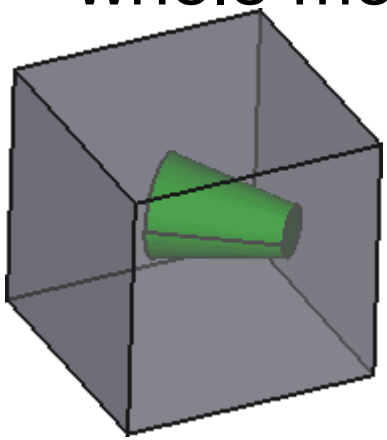


STEP file export from Rhino

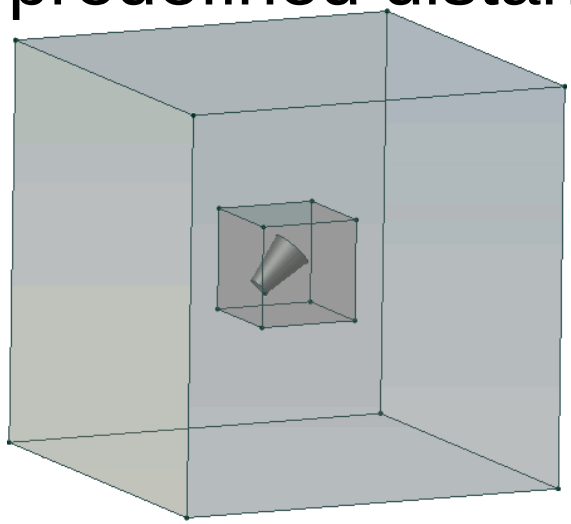


QuickField 3D CAD Import

- Compatibility with all major free and commercial CAD packages (SOLIDWORKS, Solid Edge, FreeCAD, Rhino etc.)
- STEP file import (ISO 10303)
- One body and multiple shells
- Background region (rectangular box) enclosing the whole model at the predefined distance



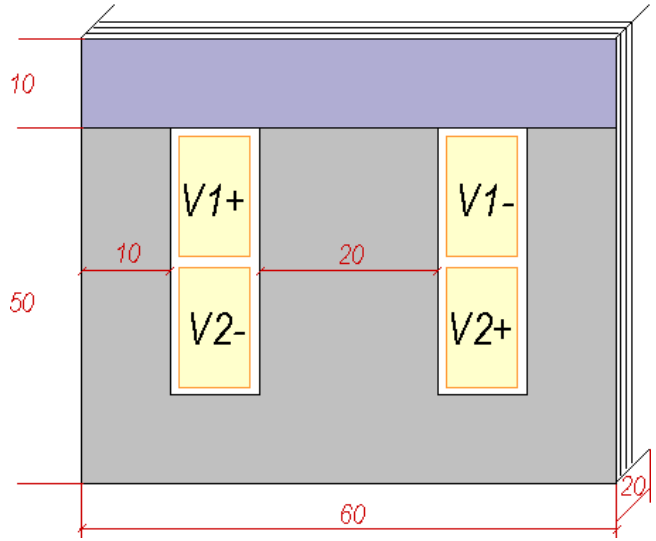
STEP file



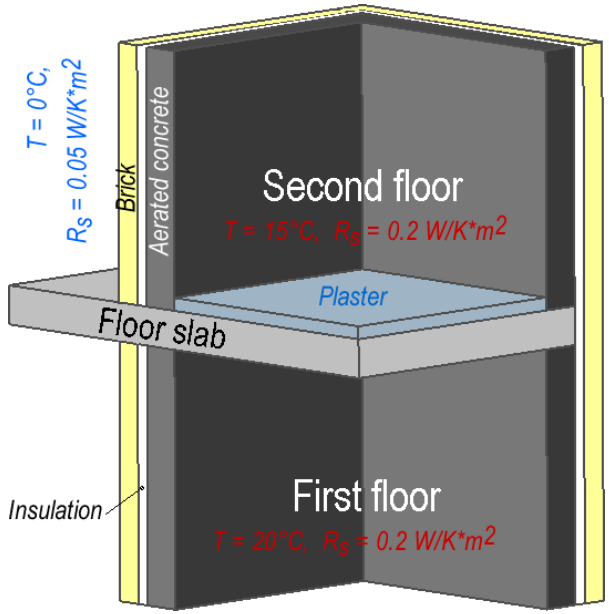
QuickField 3D geometry model

http://quickfield.com/glossary/3dimport.htm

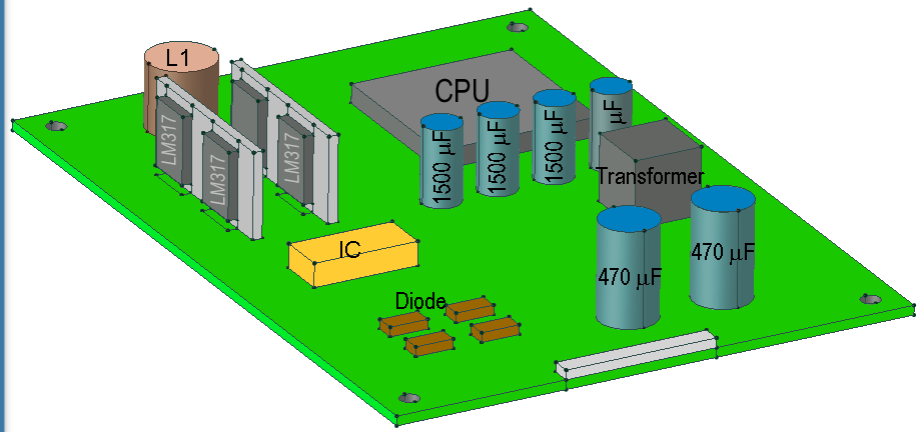
What's new in QuickField 6.2



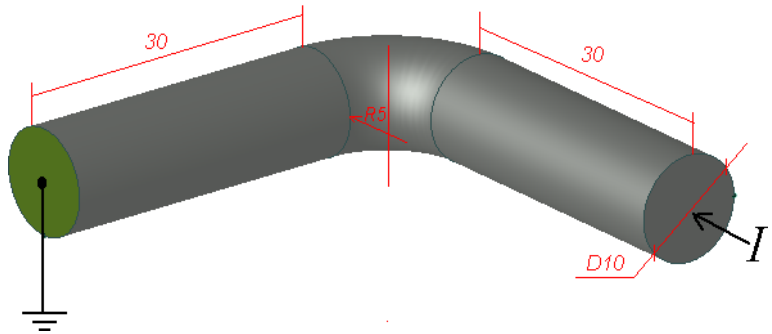
Laminated iron core losses



ISO 10211:2007 Thermal bridges in building construction.

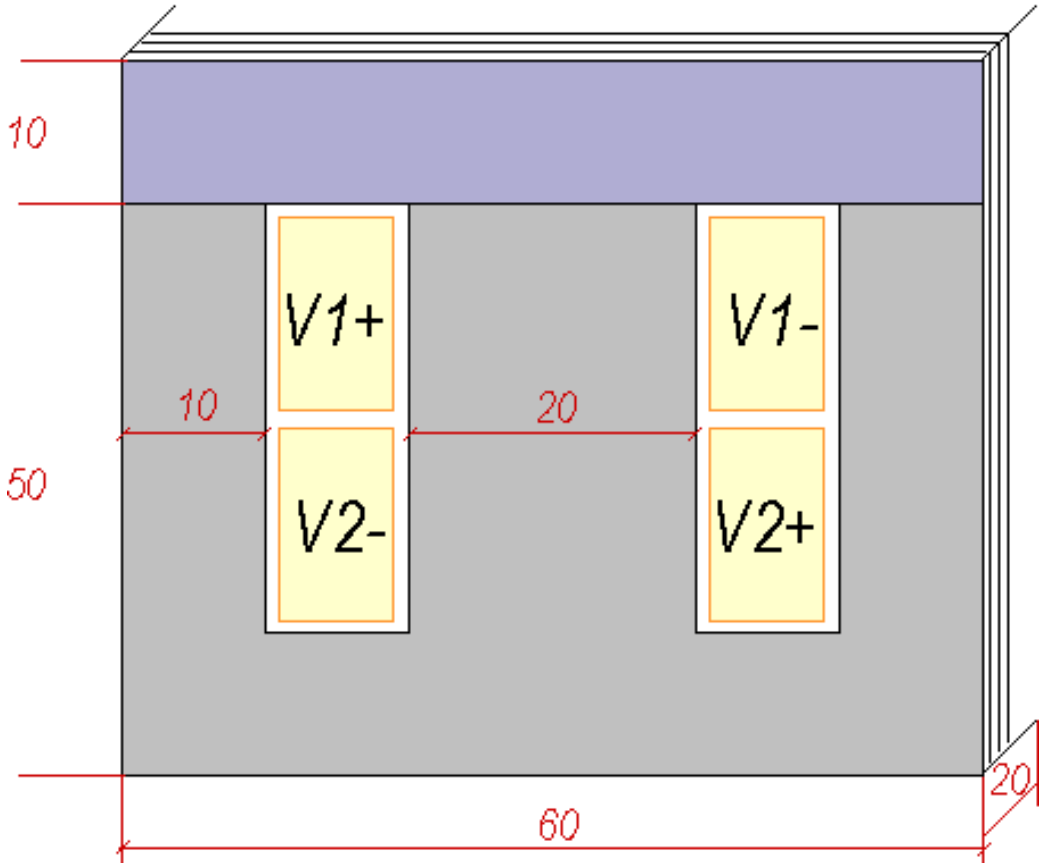


PCB thermal analysis



Bent copper wire resistance

Laminated iron core losses



Problem specification:

Core permeability – *nonlinear**
Material density ρ = 7650 kg/m^3,
Frequency *f* = 400 Hz.
Winding 1 (primary):
- no-load current 16.5 mA,
- number of turns 324,
- average turn length 111 mm.
- conductor cross-section 0.19 mm^2

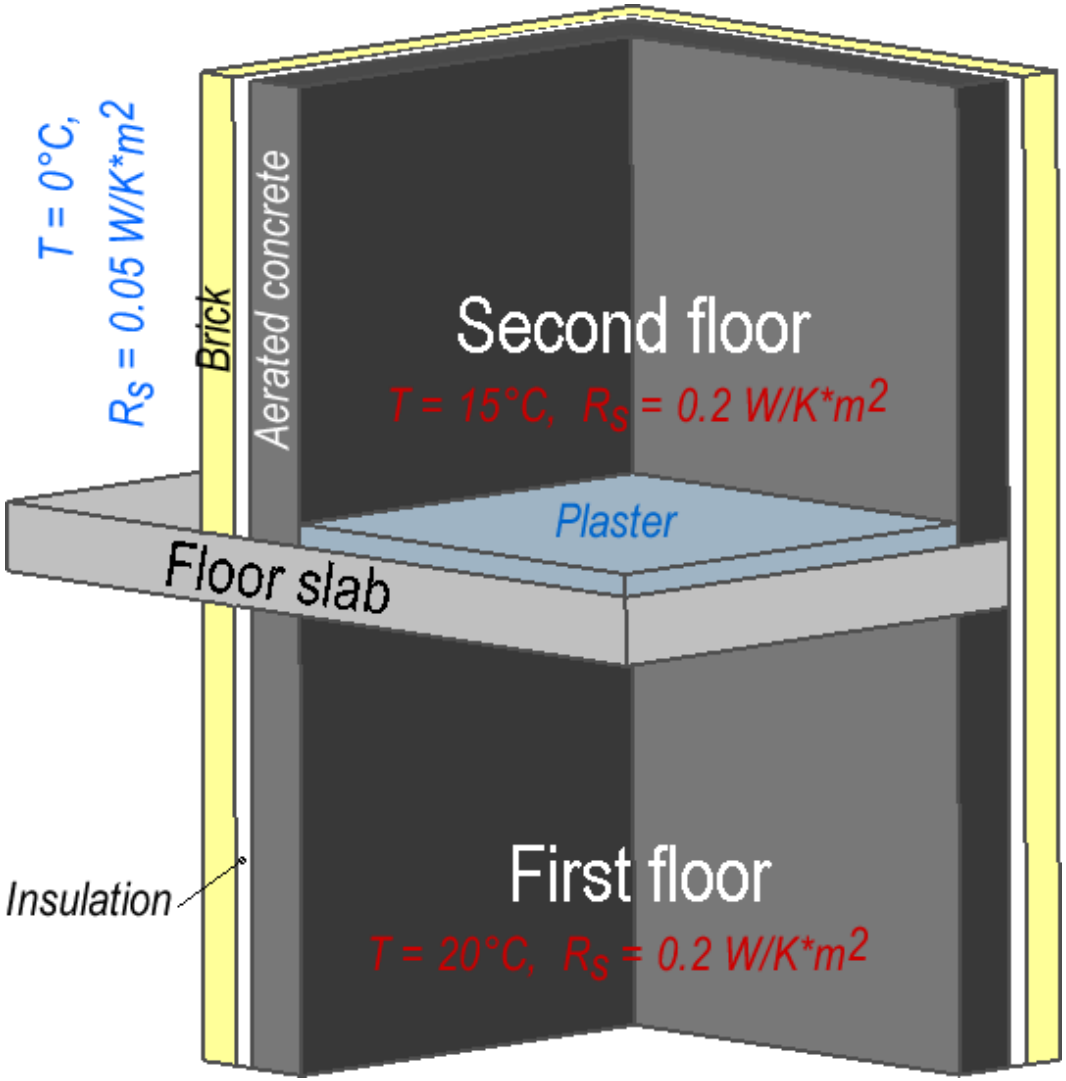
*Core loss data and magnetization curves of Arnon^{TM}5 non-grain oriented electrical steel are provided by Arnold Magnetics.

Task:

Calculate the core losses in the no-load mode of transformer..

http://quickfield.com/advanced/laminated_core_iron_loss.htm

ISO 10211:2007
Thermal bridges in building construction



Problem specification:

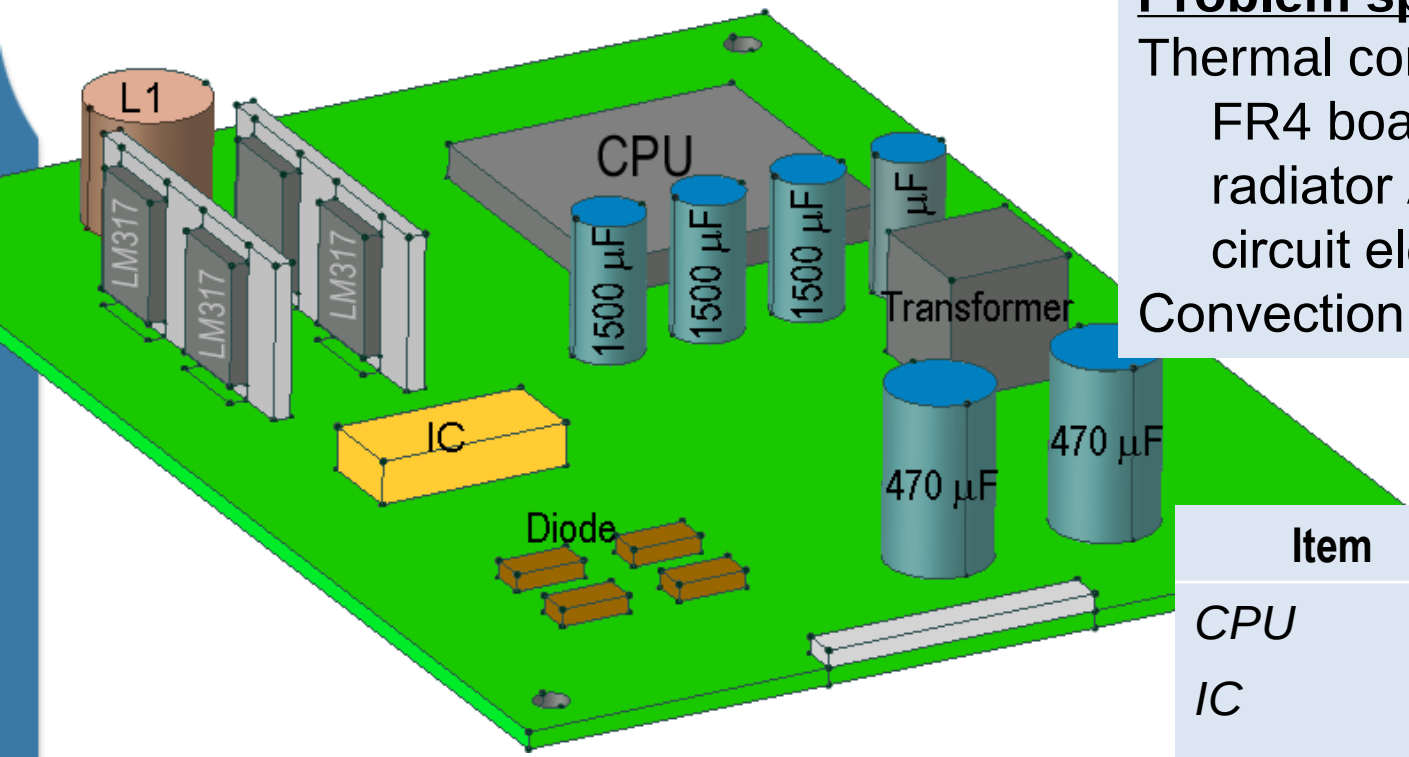
Thermal conductivity of
- AAC λ_1 = 0.7 W/K·m.
- insulation λ_2 = 0.04 W/K·m.
- brick λ_3 = 1.0 W/K·m.
- concrete slab λ_4 = 2.5 W/K·m.
- plaster λ_5 = 1 W/K·m.

Task:

Temperature distribution

http://quickfield.com/advanced/iso_10211_2007_case3.htm

PCB thermal analysis



Problem specification:

Thermal conductivity of

FR4 board $\lambda = 0.25$ W/K·m;

radiator $\lambda = 200$ W/K·m;

circuit elements $\lambda = 1$ W/K·m;

Convection coefficient $\alpha = 12$ W/K·m^2

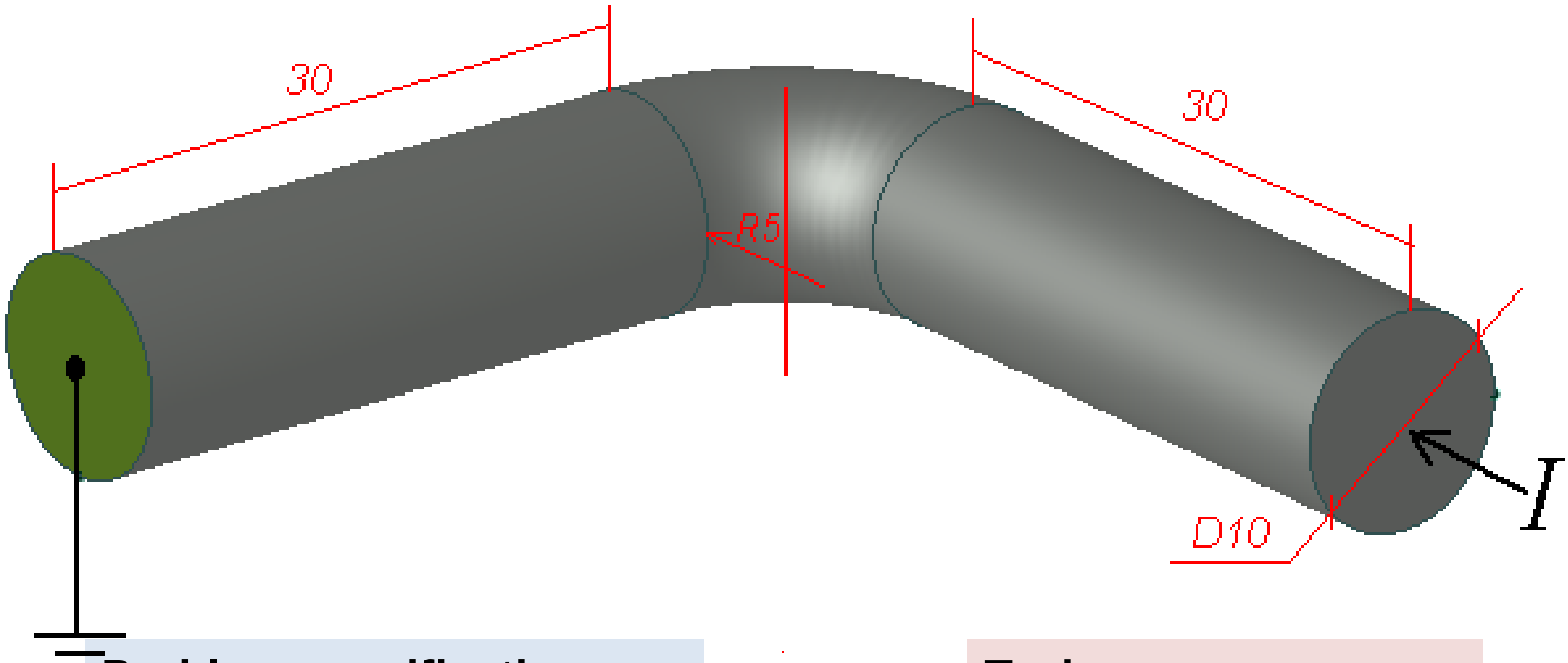
Item	Loss [W]	Volume [cm^3]
CPU	2.5	4.62
IC	0.5	1.1
LM317	0.5	0.28
470 uF	0.2	2.26
1500 uF	0.15	0.8
Transformer	0.4	2.74
Diode	0.1	0.064
L1	0.1	2.08

Task:

Calculate temperature distribution

http://quickfield.com/advanced/pcb_temperature.htm

Bent copper wire resistance



Problem specification:

Copper electric conductivity
σ = 56e6 S/m.

Current *I* = 100 A

Task:

Calculate resistance.

$R = \Delta V / I$ [Ohm]

http://quickfield.com/advanced/bent_copper_wire_resistance.htm