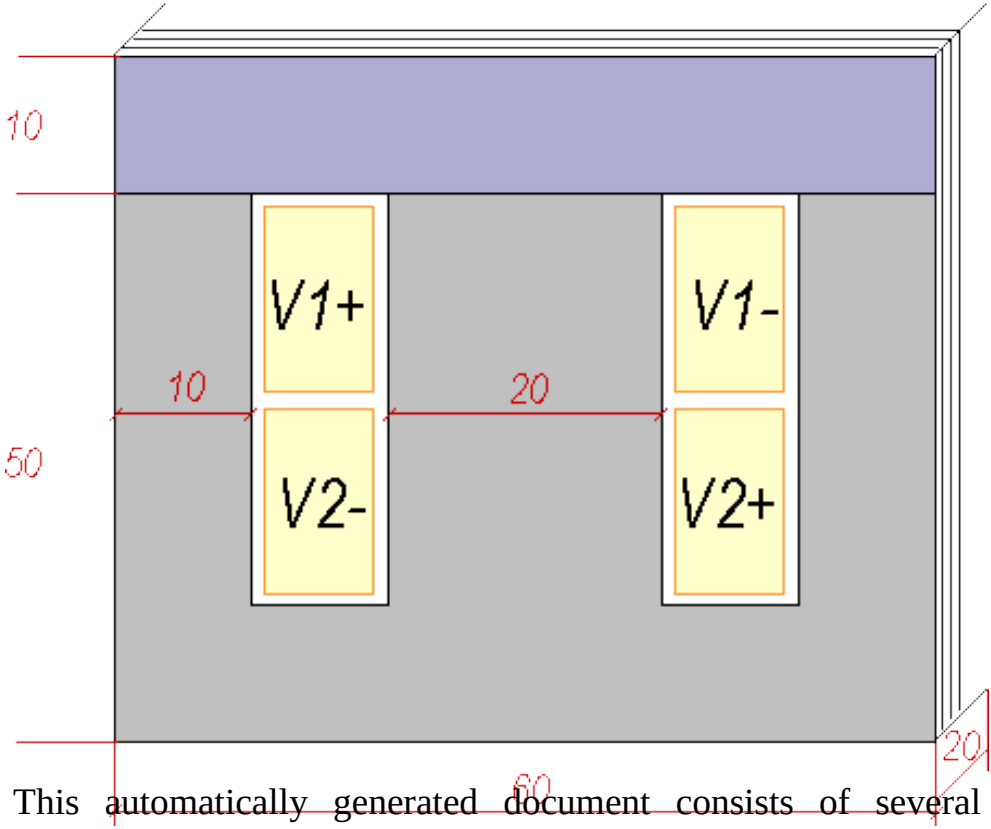
QuickField simulation report

Laminated iron core losses

Calculate core loss in no-load mode of transformer



This automatically generated document consists of several sections, which specify the problem setup and finite element analysis simulation results. Navigation links in the top of each page lead to corresponding sections of this report.

Problem description and QuickField simulation files:
https://quickfield.com/advanced/laminated_core_iron_loss.htm

Problem info

Problem type: AC Magnetics , frequency: 400 Hz,
Geometry model class: Plane-Parallel
Problem database file names:

- Problem: *laminated_core_iron_loss.pbm*
- Geometry: *Laminated_core_iron_loss.mod*
- Material Data: *Laminated_core_iron_loss.dhe*
- Material Data 2 (library): *none*
- Electric circuit: *none*

Results taken from other problems:

- *none*

Geometry model

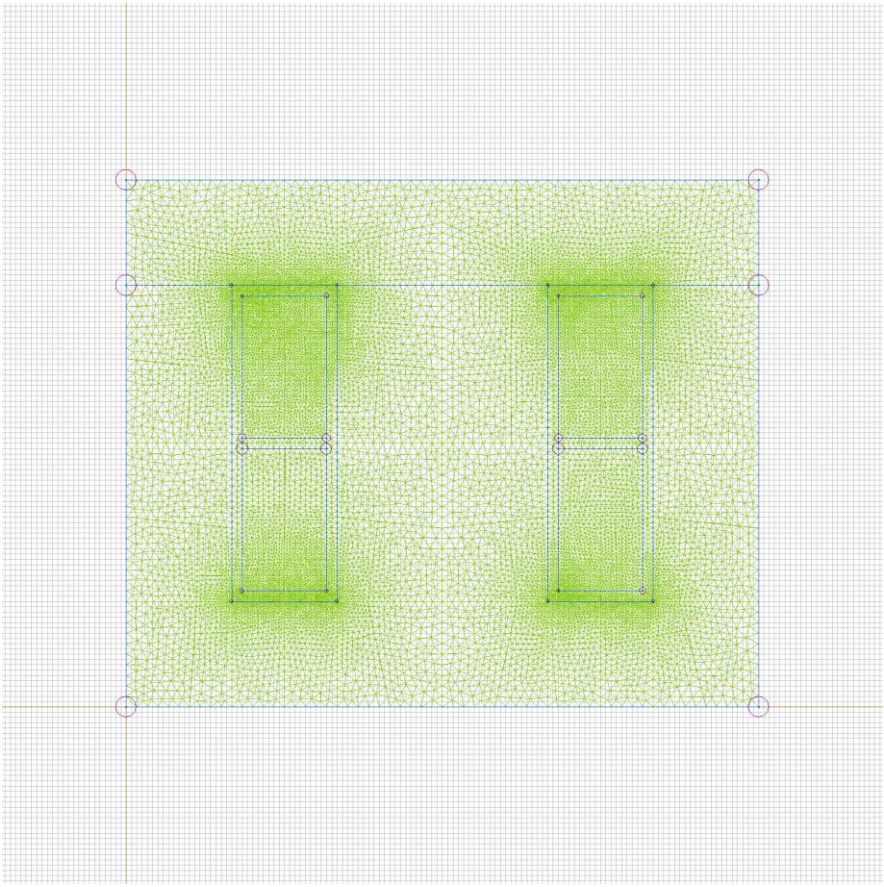


Table 1. Geometry model statistics

	With Label	Total
Blocks	7	10
Edges	1	37
Vertices	0	30

Number of nodes: 16709.

Labelled objects

There are following labelled objects in the geometry model (Material Data file could contain more labels, but only those labels that assigned to geometric objects are listed)

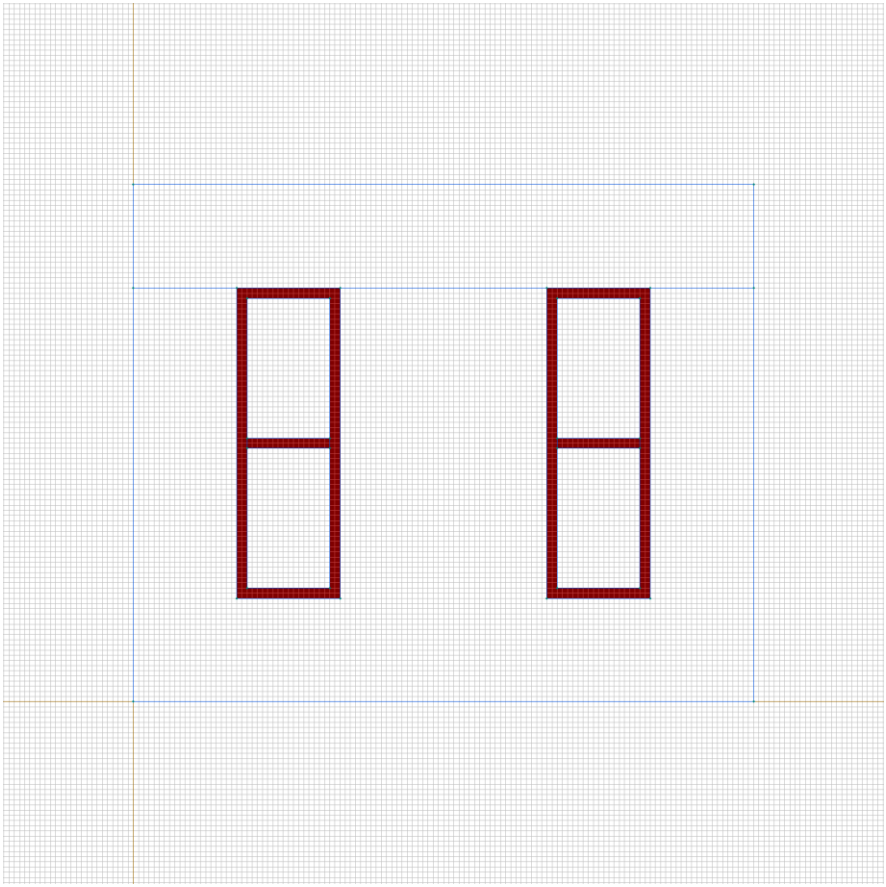
Blocks:	Edges:	Vertices:
• insulation • core I Arnon5 • V1+ • core E Arnon7 • v2- • v2+ • V1- •	• boundary •	

Detailed information about each label is listed below.

Labelled objects: block "insulation"

There are (4) objects with this label

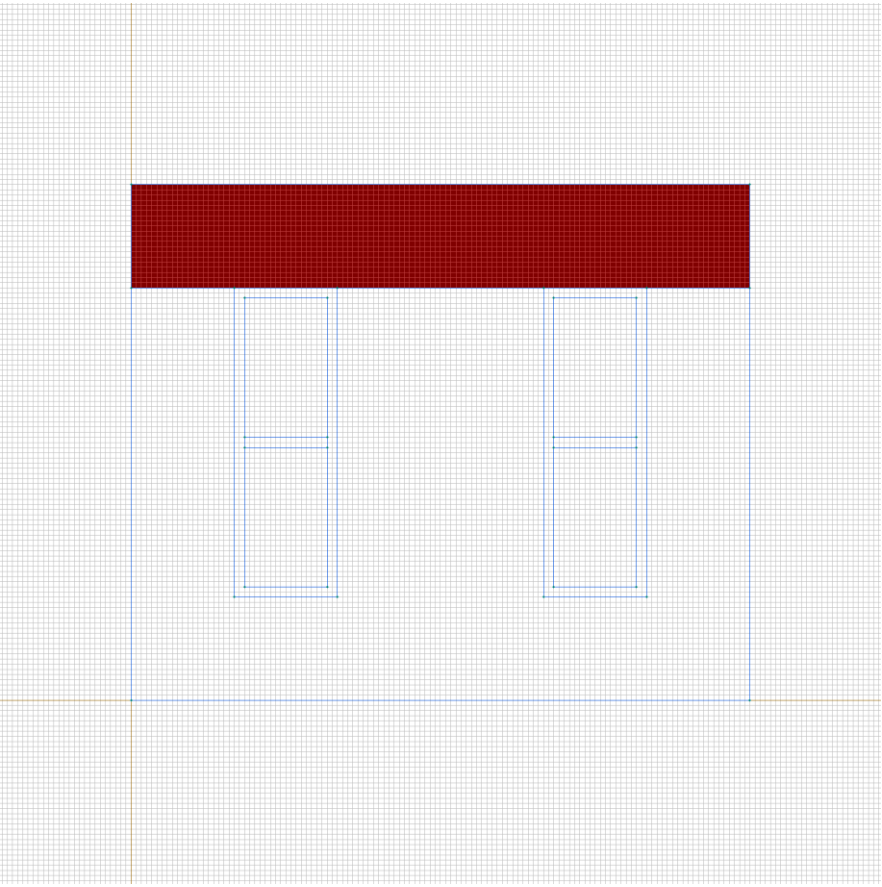
Relative magnetic permeability: mu_x=1, mu_y=1
Electric conductivity: sigma=0 [S/m]
Current density: j=0 [A/m2], phase 0 [deg]
Conductor's connection: in parallel



Labelled objects: block "core l Arnon5"

There are (1) objects with this label

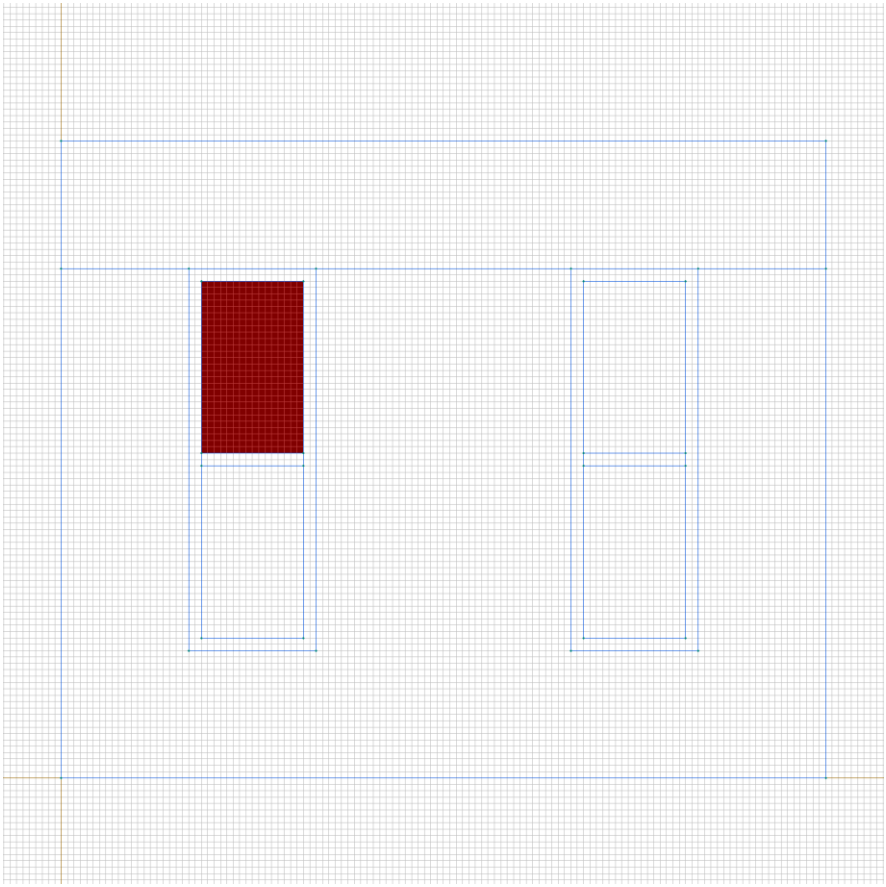
Relative magnetic permeability: mu=nonlinear (see Table 2 in the "Nonlinear dependencies" section)
Electric conductivity: sigma=0 [S/m]
Current density: j=0 [A/m2], phase 0 [deg]
Conductor's connection: in parallel



Labelled objects: block "V1+"

There are (1) objects with this label

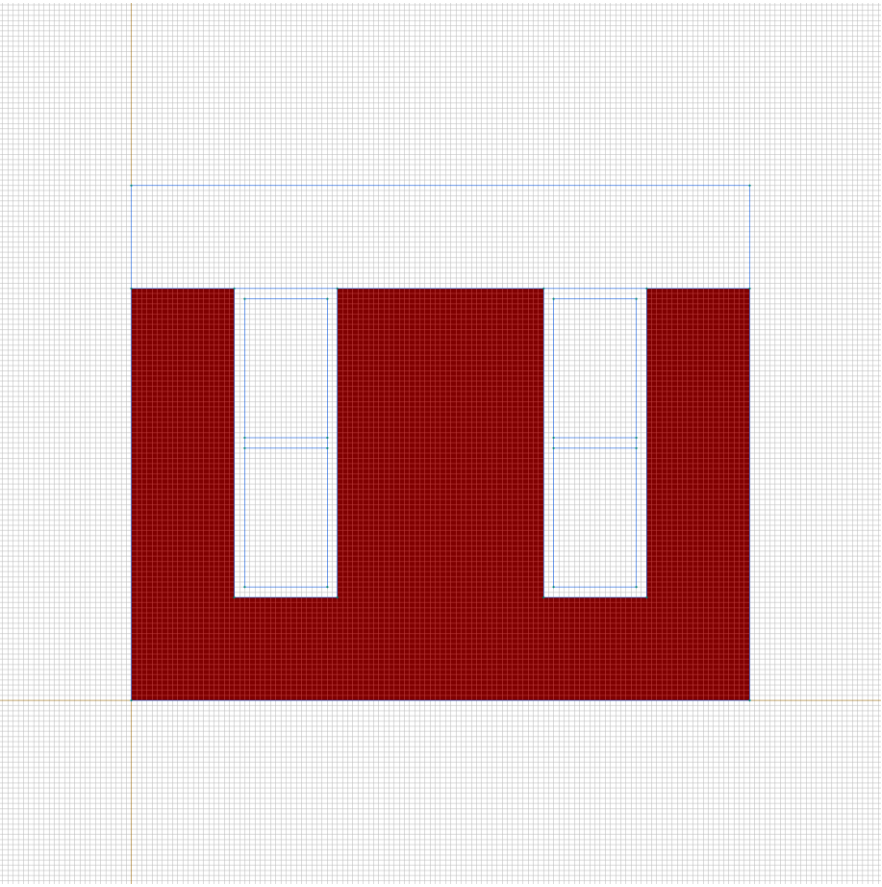
Relative magnetic permeability: mu_x=1, mu_y=1
Electric conductivity: sigma=0 [S/m]
Total current: I=5.3*sqrt(2) [A], phase 0 [deg]
Conductor's connection: in parallel



Labelled objects: block "core E Arnon7"

There are (1) objects with this label

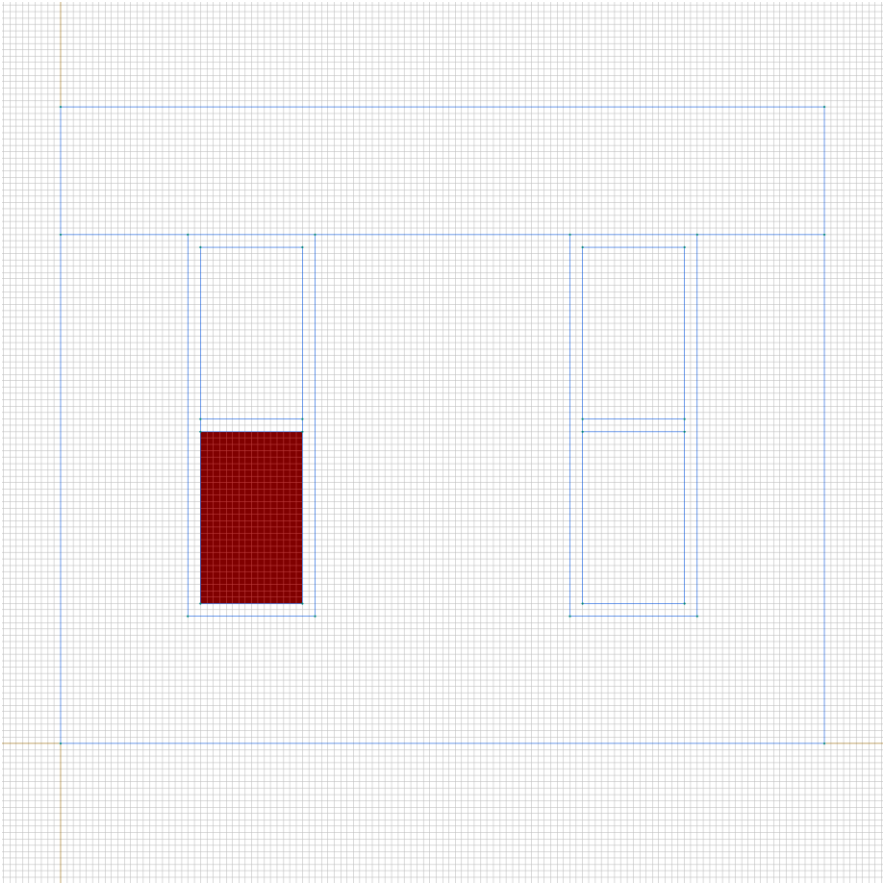
Relative magnetic permeability: mu=nonlinear (see Table 3 in the "Nonlinear dependencies" section)
Electric conductivity: sigma=0 [S/m]
Current density: j=0 [A/m2], phase 0 [deg]
Conductor's connection: in parallel



Labelled objects: block "v2-"

There are (1) objects with this label

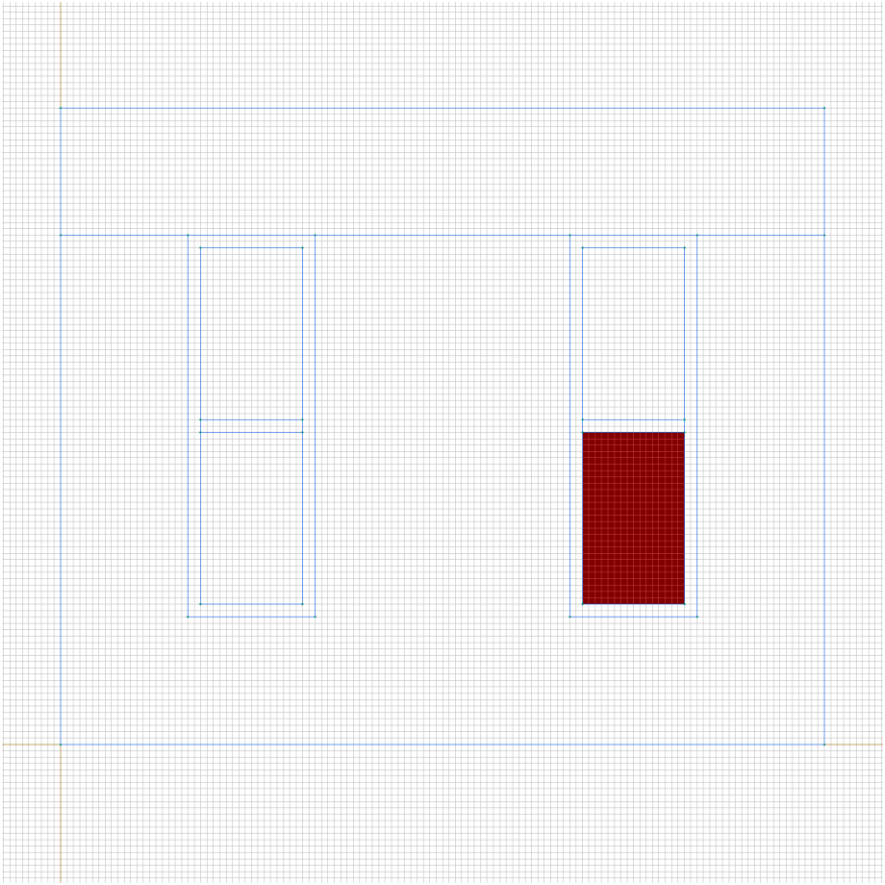
Relative magnetic permeability: mu_x=1, mu_y=1
Electric conductivity: sigma=0 [S/m]
Current density: j=0 [A/m2], phase 0 [deg]
Conductor's connection: in parallel



Labelled objects: block "v2+"

There are (1) objects with this label

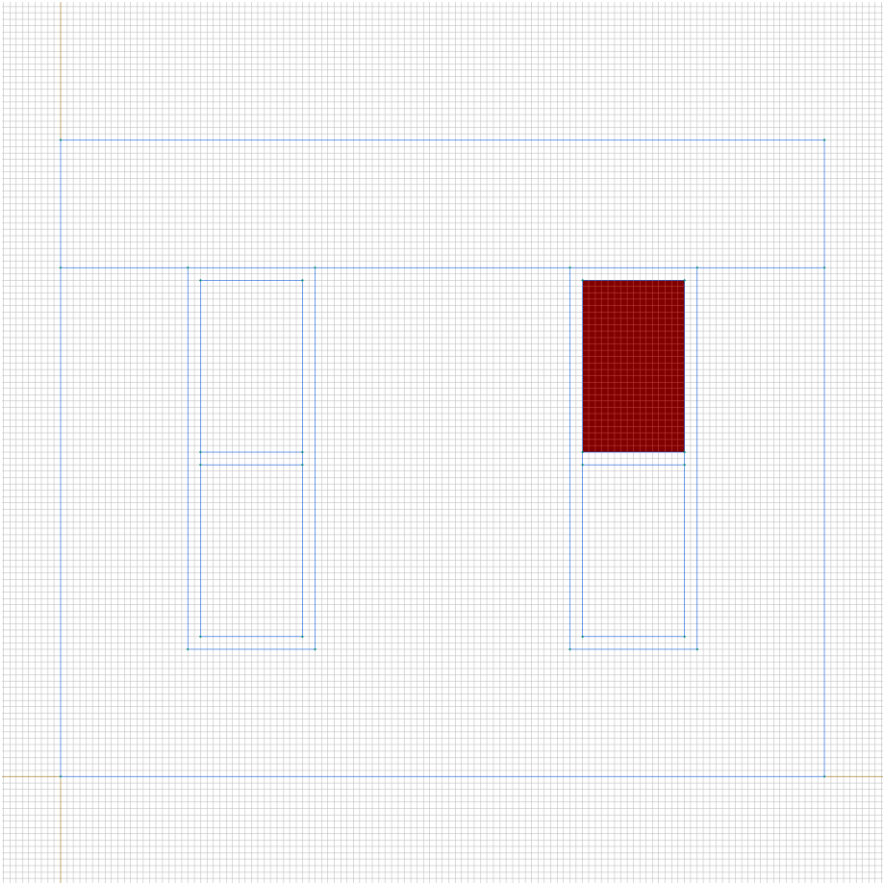
Relative magnetic permeability: mu_x=1, mu_y=1
Electric conductivity: sigma=0 [S/m]
Current density: j=0 [A/m2], phase 0 [deg]
Conductor's connection: in parallel



Labelled objects: block "V1-"

There are (1) objects with this label

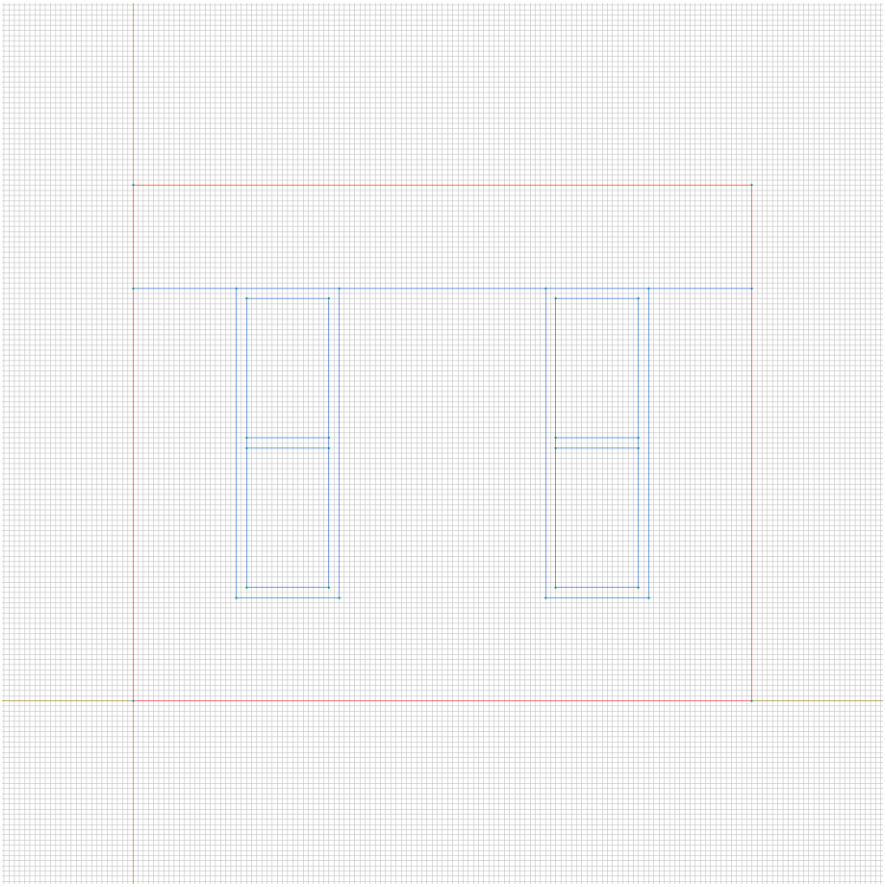
Relative magnetic permeability: mu_x=1, mu_y=1
Electric conductivity: sigma=0 [S/m]
Total current: I=-5.3*sqrt(2) [A], phase 0 [deg]
Conductor's connection: in parallel



Labelled objects: edge "boundary"

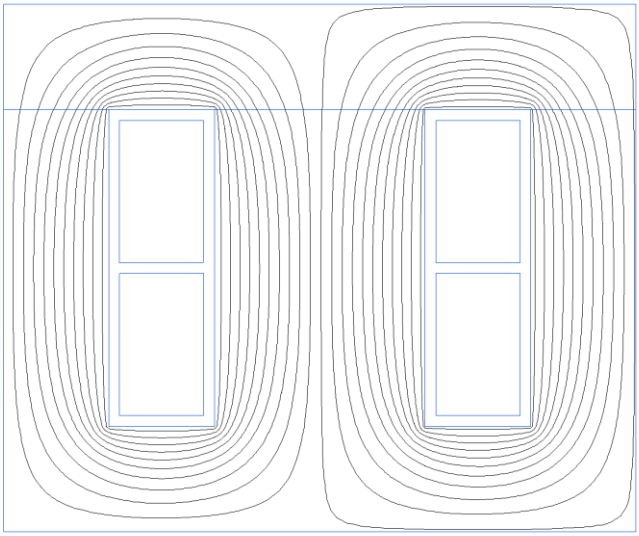
There are (6) objects with this label

Magnetic potential: A=0 [Wb/m], phase 0 [deg]



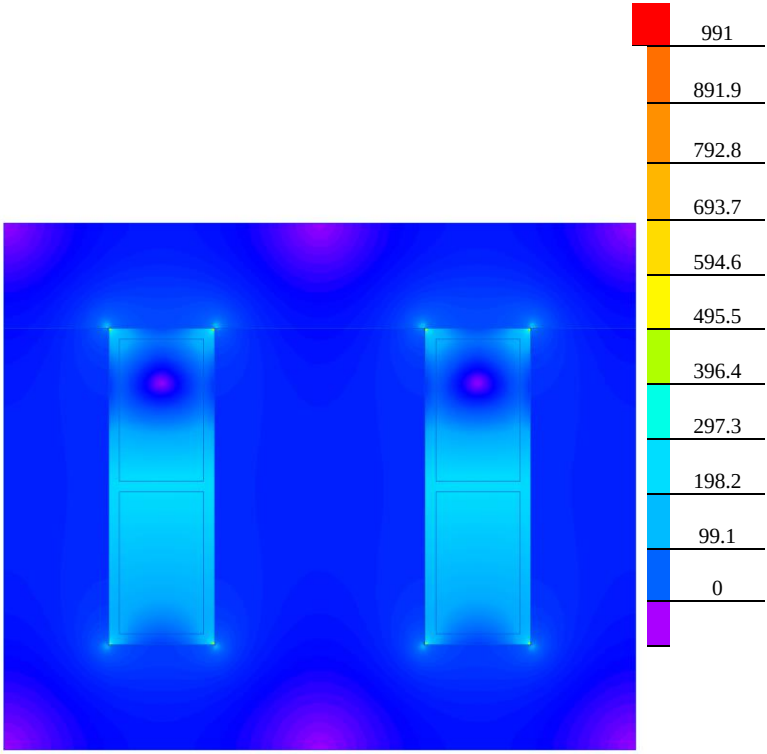
Results

Field lines



Results

Color map of Strength |H| [A/m]



Nonlinear dependencies

Table 2. BH-curve

B [T]	H [A/m]
0	0
0.2	51.73
0.2625	55.7
0.3619	63.66
0.4532	71.62
0.5371	79.58
0.8766	119.37
1.0459	159.15
1.1405	198.94
1.2144	238.73
1.2564	278.52
1.3279	397.9
1.3558	477.5
1.3739	557
1.3879	636.6
1.4027	716.2
1.4142	795.8
1.452	1193.7
1.4734	1591.5

Table 3. BH-curve

B [T]	H [A/m]
0	0
0.2145	47.75
0.3226	55.7

0.4406	63.66
0.5478	71.62
0.6392	79.58
0.9376	119.37
1.0938	159.15
1.1852	198.94
1.2542	238.73
1.2982	278.52
1.3298	318.3
1.3696	397.9
1.4186	557
1.4534	795.8
1.4891	1193.7
1.5131	1591.5