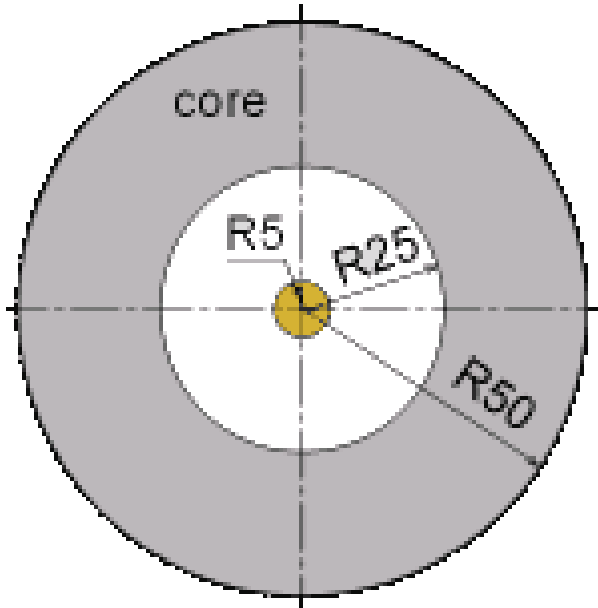


QuickField simulation report

Nonlinear ferromagnetic core in sinusoidal magnetic field

Magnetic field distribution along the radius of the core



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/hmagn3.htm>

Problem info

Problem type: AC Magnetics , frequency: 50 Hz,

Geometry model class: Plane-Parallel

Problem database file names:

- Problem: *hmagn3.pbm*
- Geometry: *Hmagn3.mod*
- Material Data: *Hmagn3.dhe*
- Material Data 2 (library): *none*
- Electric circuit: *none*

Results taken from other problems:

- *none*

Geometry model

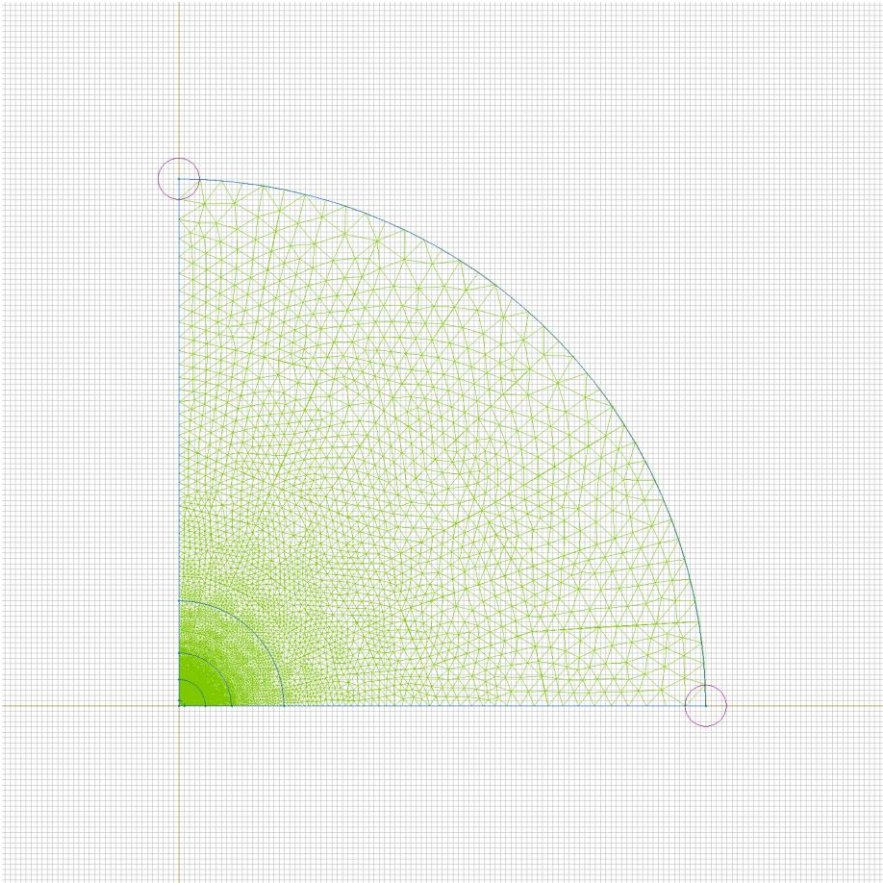


Table 1. Geometry model statistics

	With Label	Total
Blocks	3	5
Edges	2	15
Vertices	0	11

Number of nodes: 38371.

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:

- [current](#)
- [air](#)
- [core](#)
-

Edges:

- [symmetry](#)
- [far away](#)
-

Vertices:

Detailed information about each label is listed below.

Labelled objects: block "current"

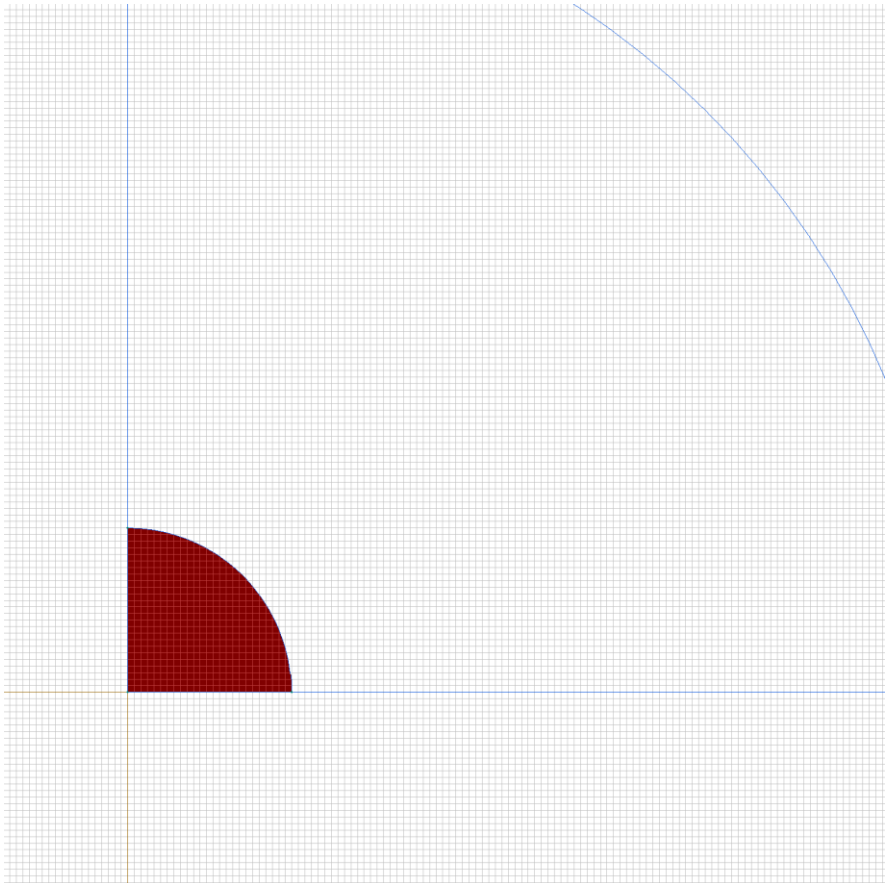
There are (1) objects with this label

Relative magnetic permeability: $\mu_x=1$, $\mu_y=1$

Electric conductivity: $\sigma=0$ [S/m]

Total current: $I=125$ [A], phase 0 [deg]

Conductor's connection: in parallel



Labelled objects: block "air"

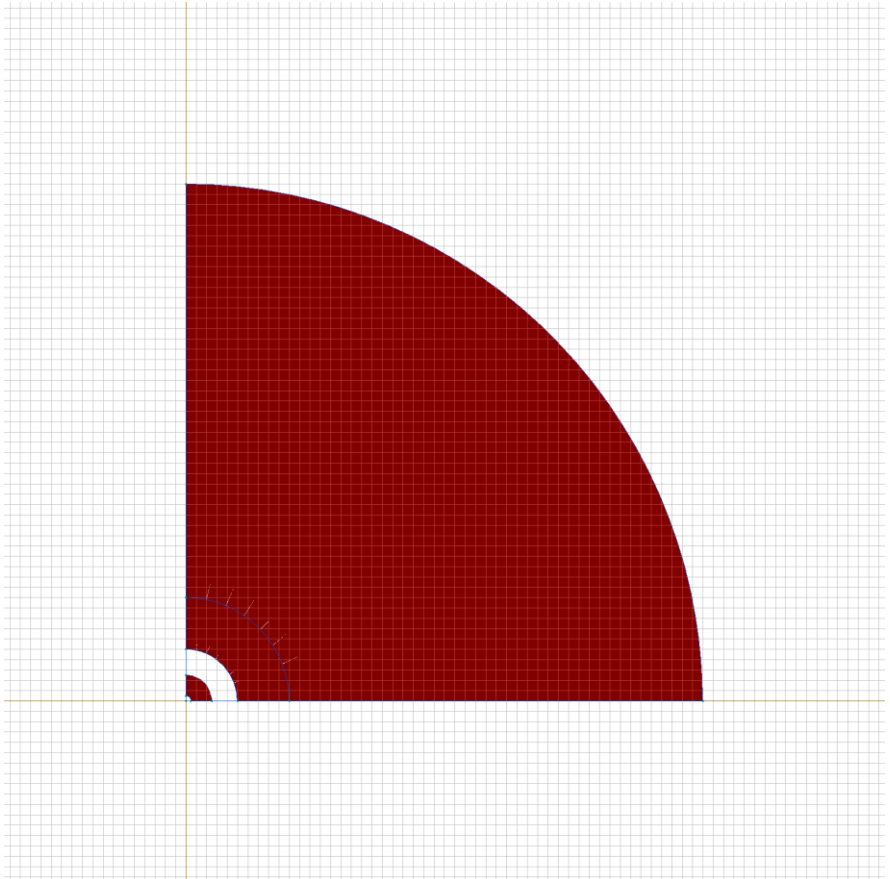
There are (3) objects with this label

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"

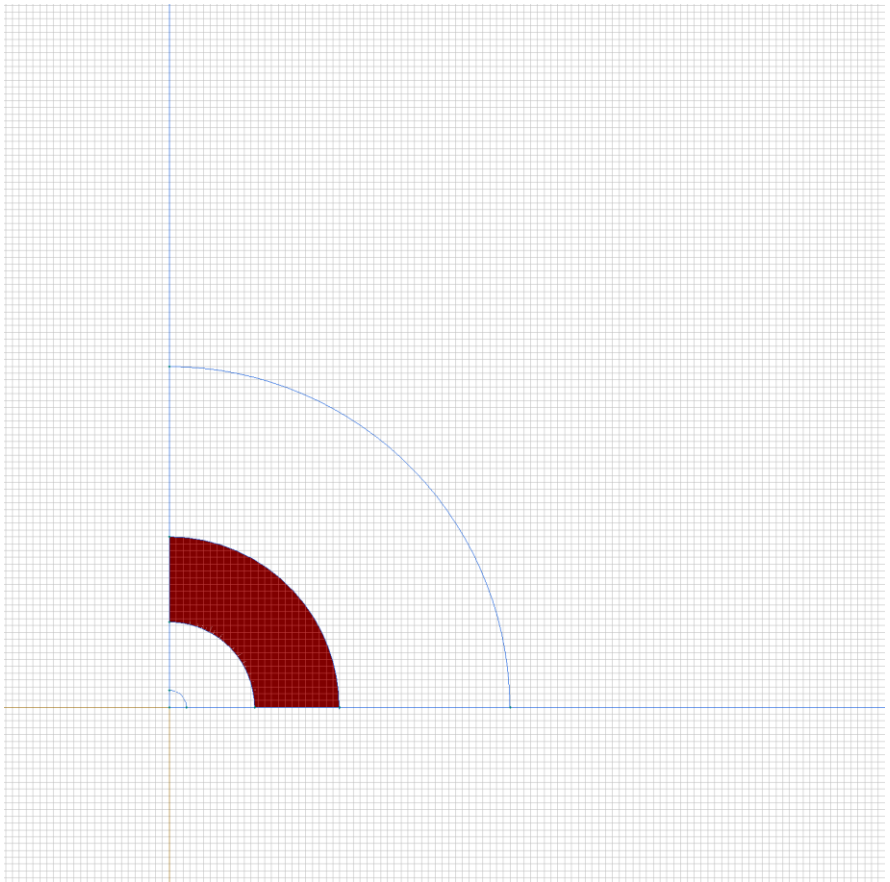
There are (1) objects with this label

Relative magnetic permeability: μ =nonlinear (see Table 2 in the "Nonlinear dependencies" section)

Electric conductivity: σ =0 [S/m]

Current density: j =0 [A/m²], phase 0 [deg]

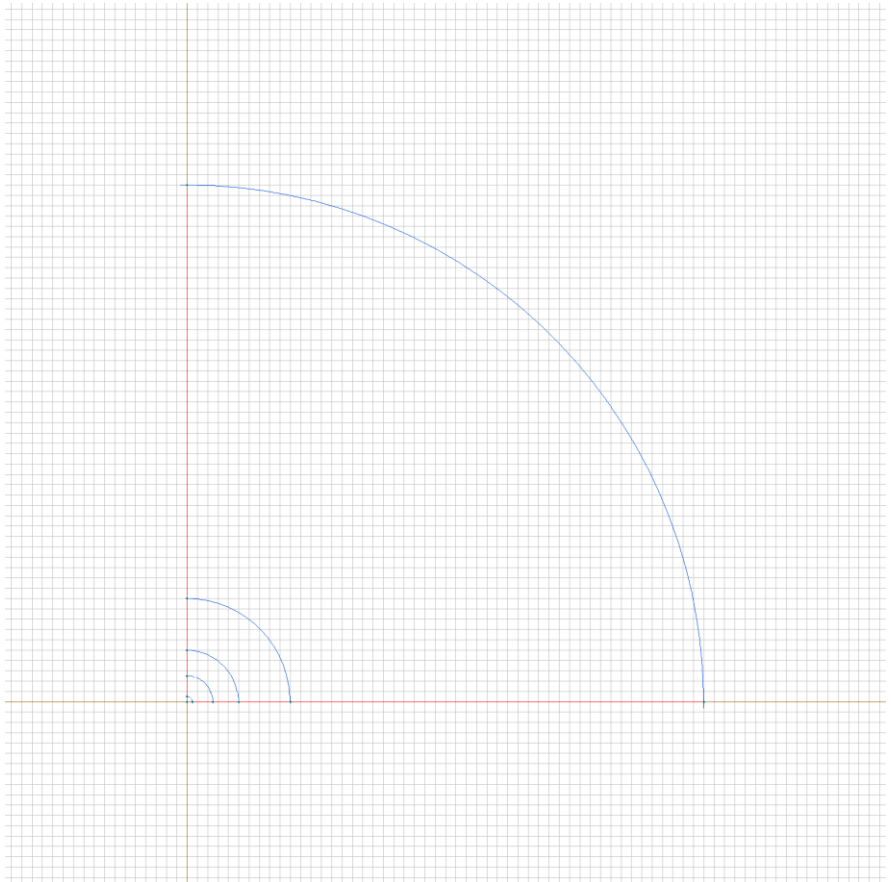
Conductor's connection: in parallel



Labelled objects: edge "symmetry"

There are (10) objects with this label

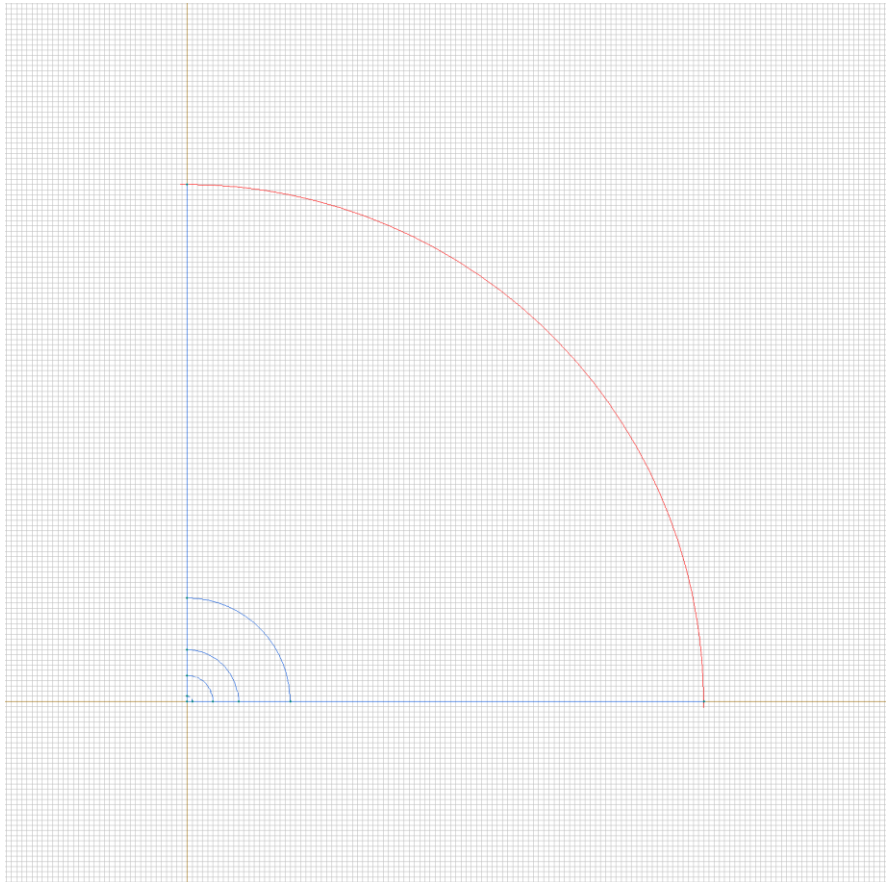
Tangential field: $H_t=0$ [A/m], phase 0 [deg]



Labelled objects: edge "far away"

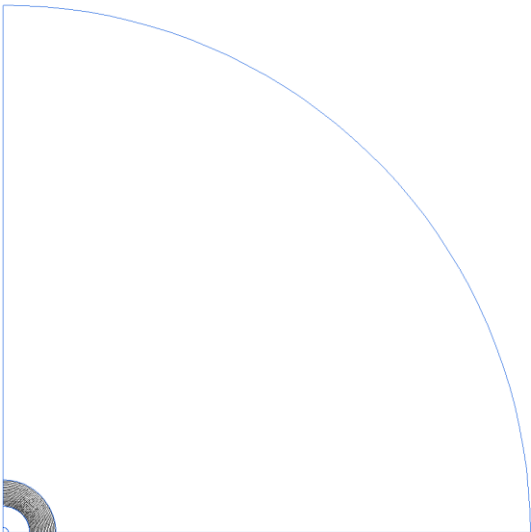
There are (1) objects with this label

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



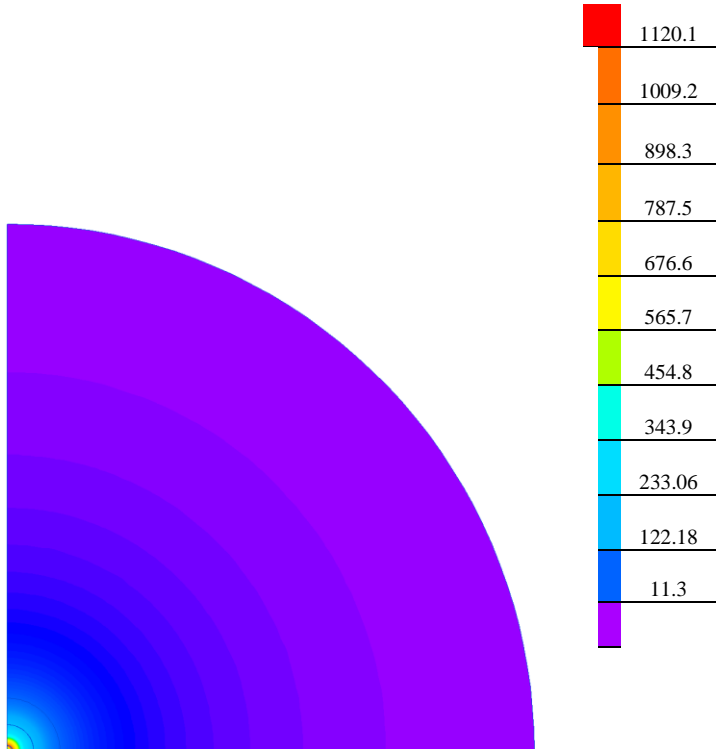
Results

Field lines



Results

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



Nonlinear dependencies

Table 2. BH-curve

B [T]	H [A/m]
0	0
0.1	1
0.2	4
0.3	9
0.4	16
0.5	25
0.6	36
0.7	49
0.8	64
0.9	81
1	100
1.5	225
2	400