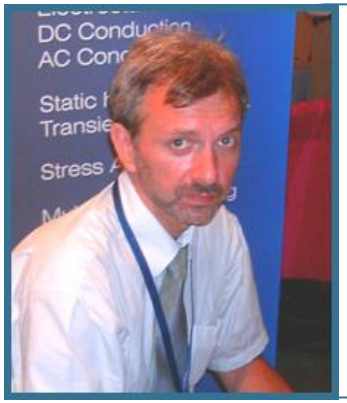
Permanent magnets modeling with QuickField



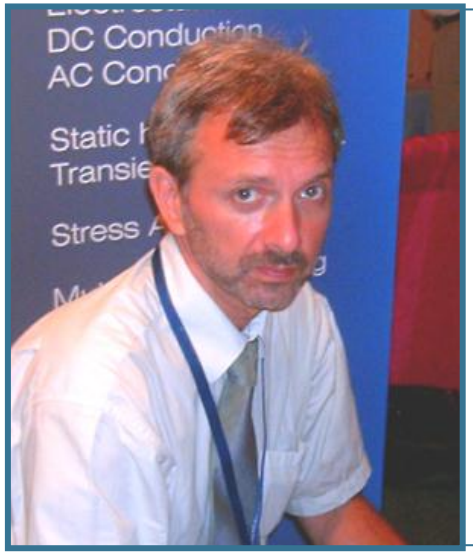
Vladimir Podnos
Director of marketing and support, Tera Analysis Ltd.

Magnetic analysis with QuickField

Sergey Ionin
Support engineer, Tera Analysis Ltd.

Permanent magnets simulation in QuickField

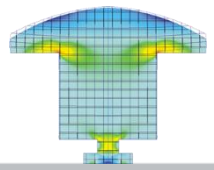
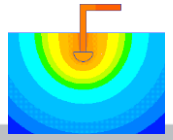
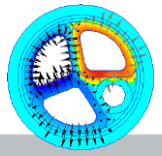
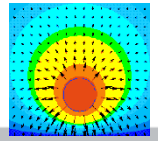
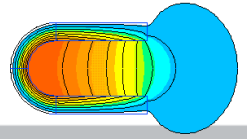
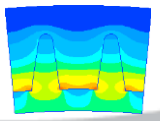
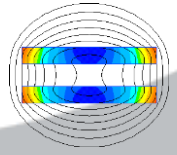
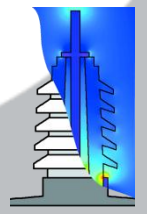
Magnetic analysis with QuickField



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

QuickField

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

QuickField

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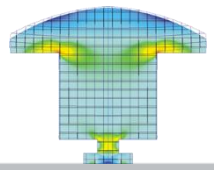
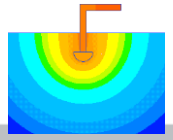
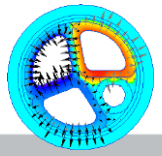
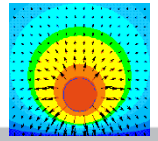
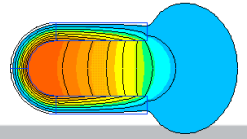
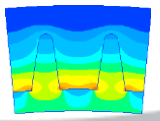
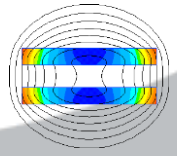
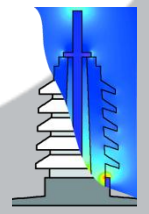
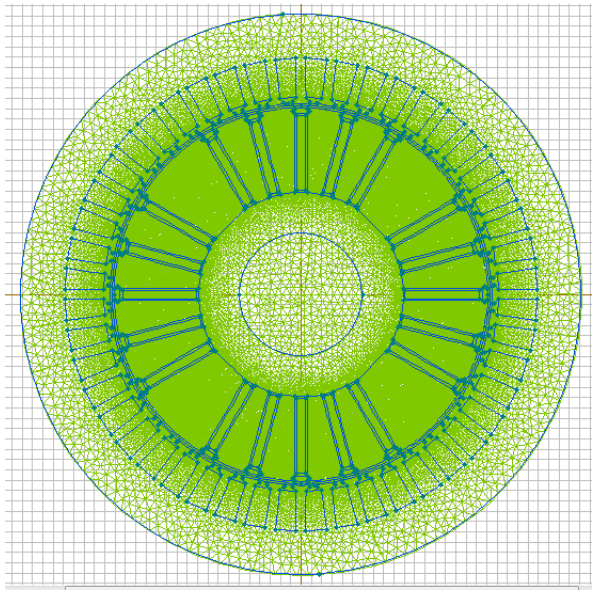
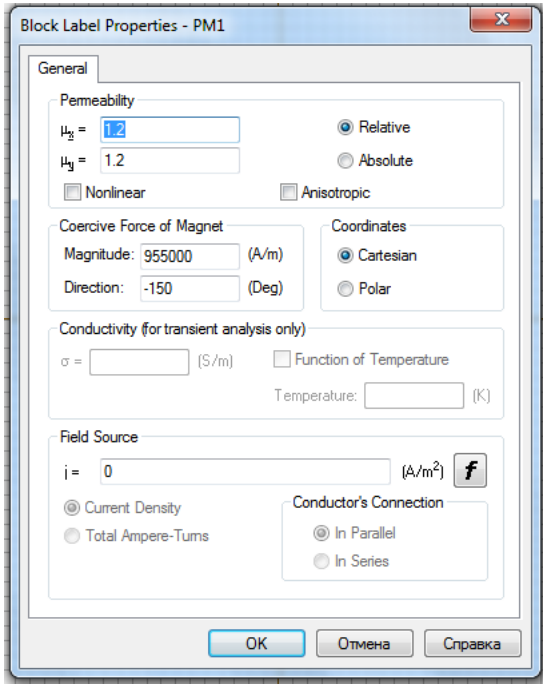
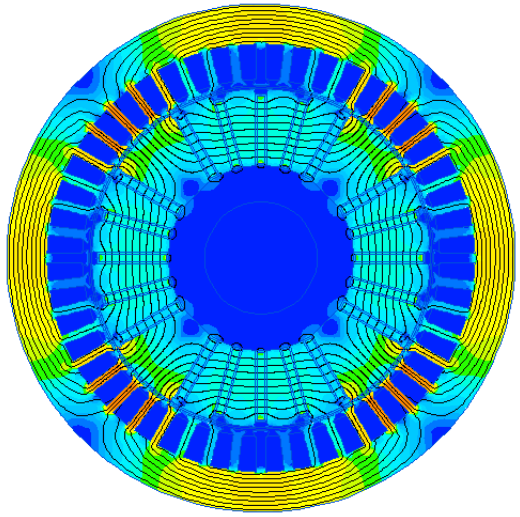









Stages of solution





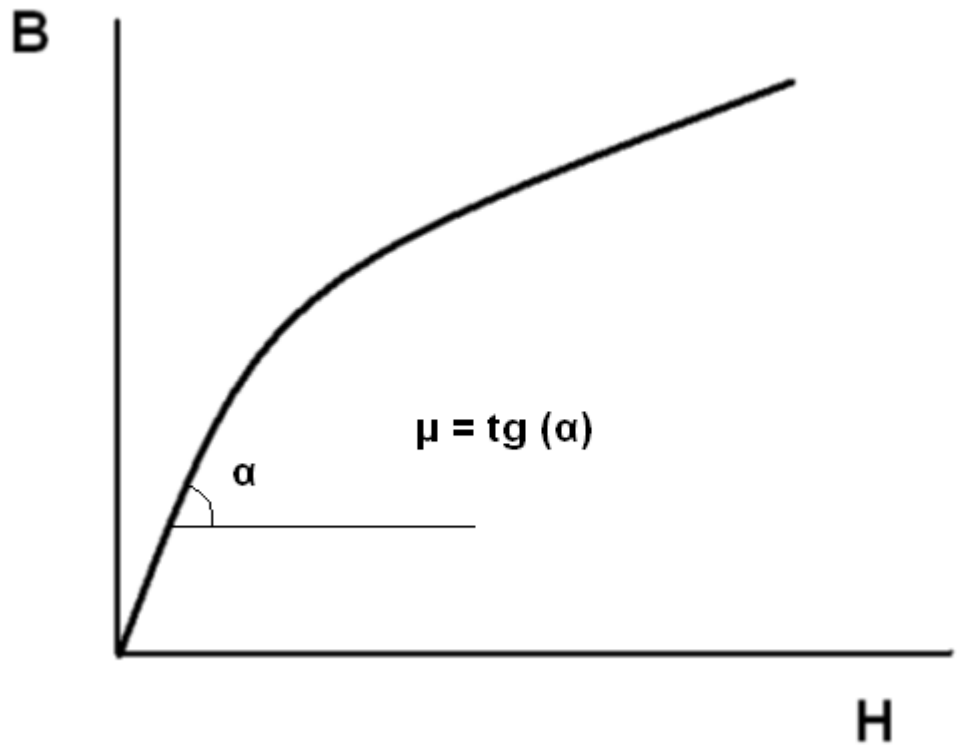


Model

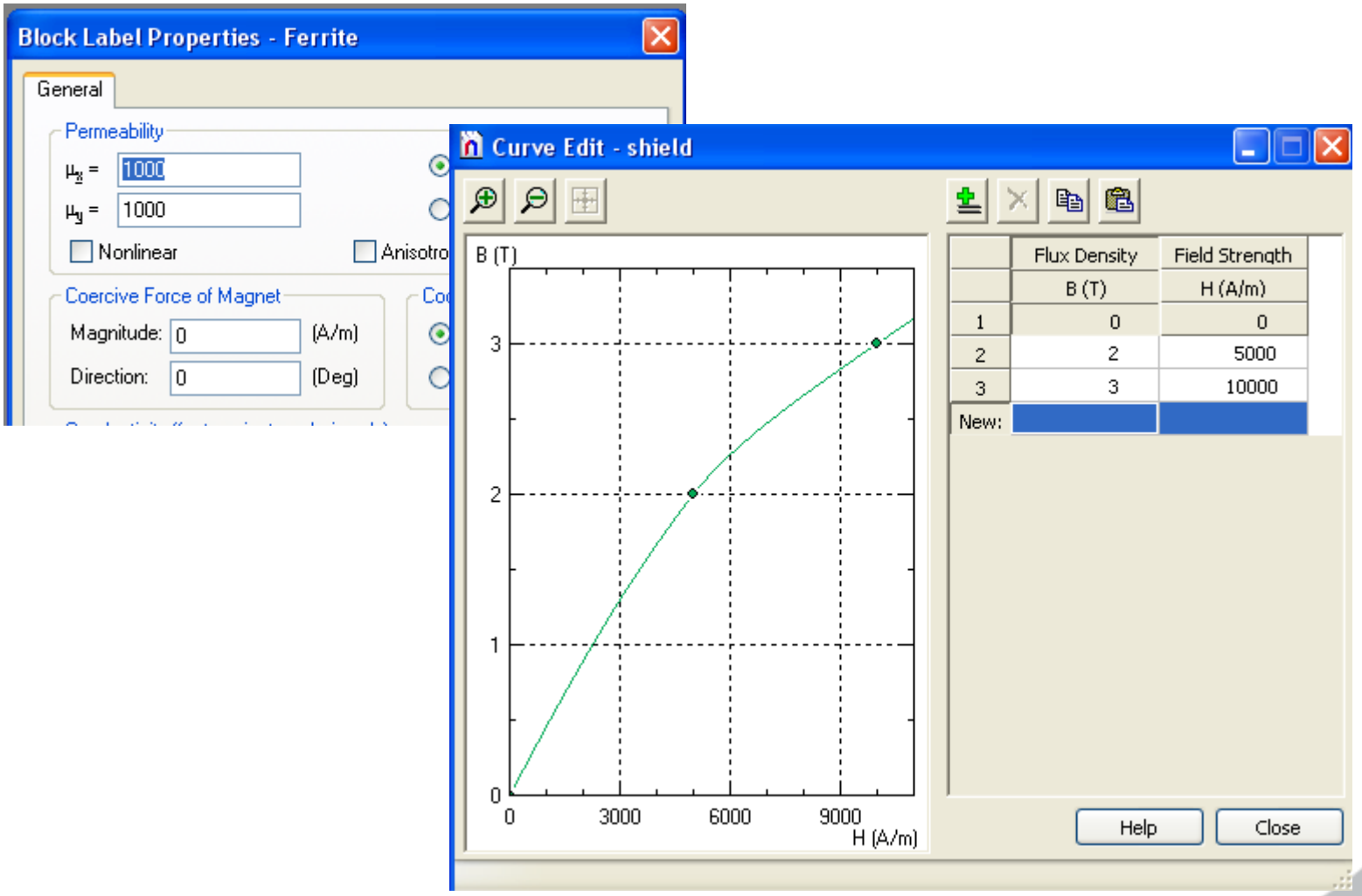
Physical parameters

Result

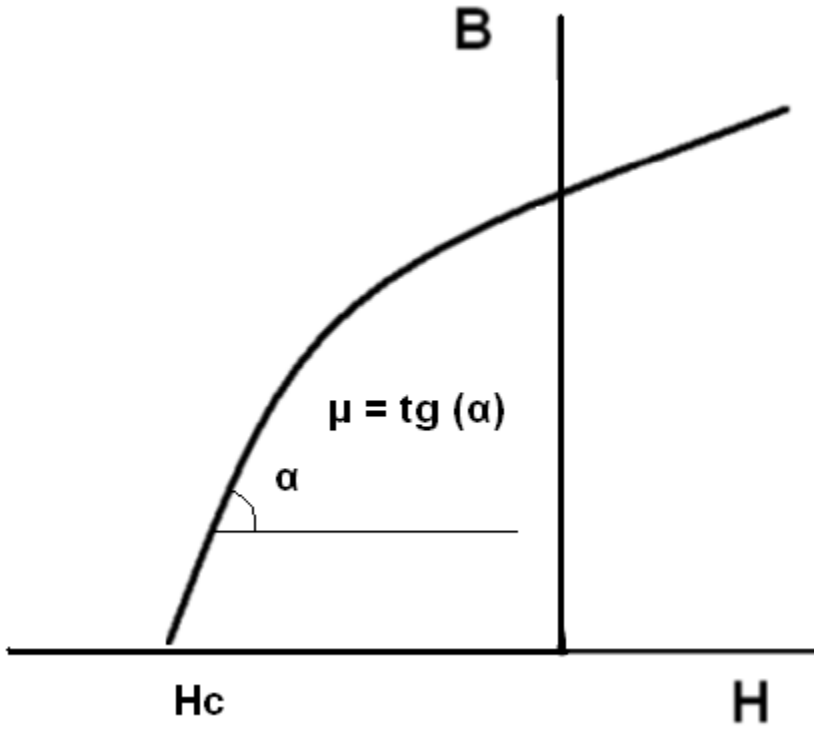
Magnetic material properties



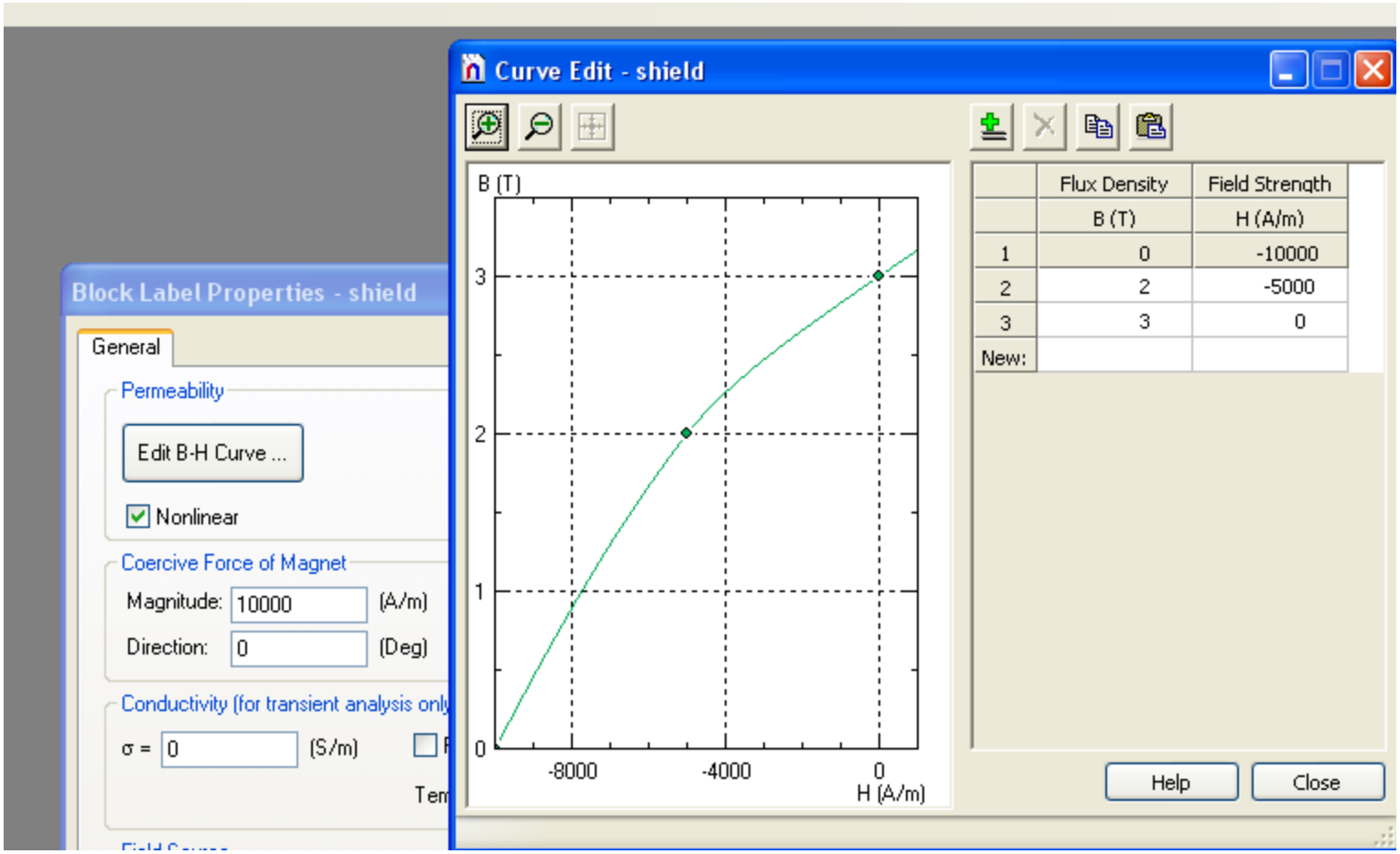
Magnetic material properties



Permanent magnet properties



Permanent magnet properties



Types of analysis with permanent magnets

Magnetic analysis suite	
Magnetic Problems	Magnetostatics
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Electric analysis suite	
Electric Problems	Electrostatics and DC Conduction
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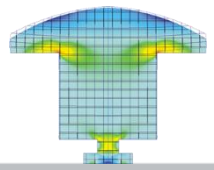
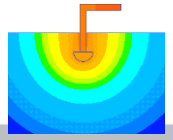
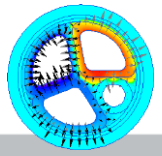
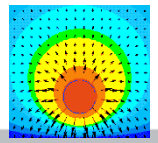
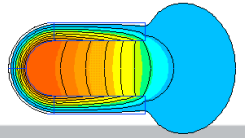
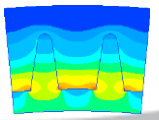
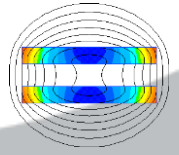
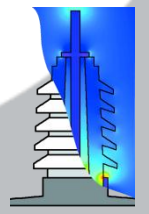
	Stress analysis

Permanent magnets modeling with QuickField

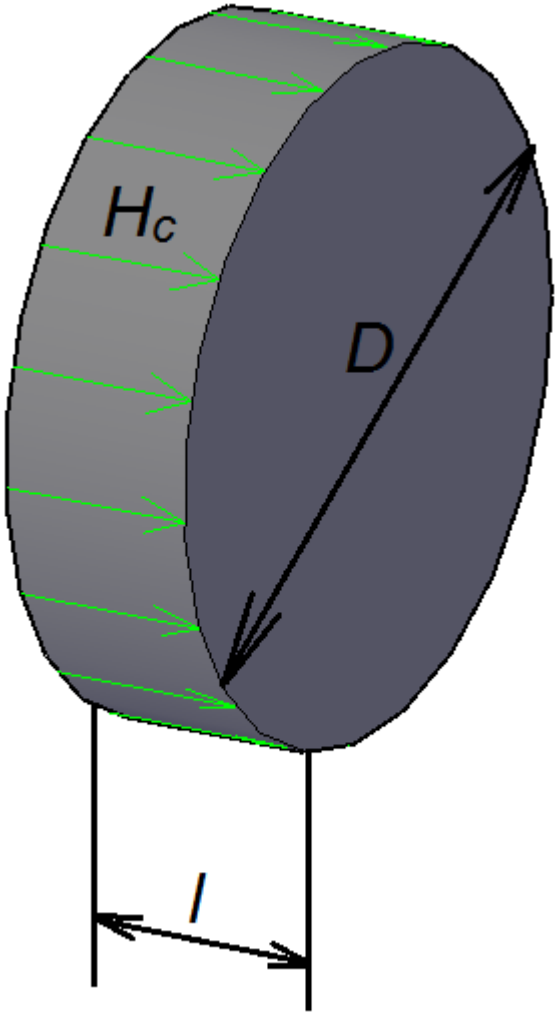
Sergey Ionin

Support engineer, Tera Analysis Ltd.

Permanent magnets modeling

1. Single magnet.
2. Two magnets.
3. Magnet and ferromagnetic.
4. Magnet and direct current.
5. Magnet and transient current.
6. Automation.

1. Single magnet

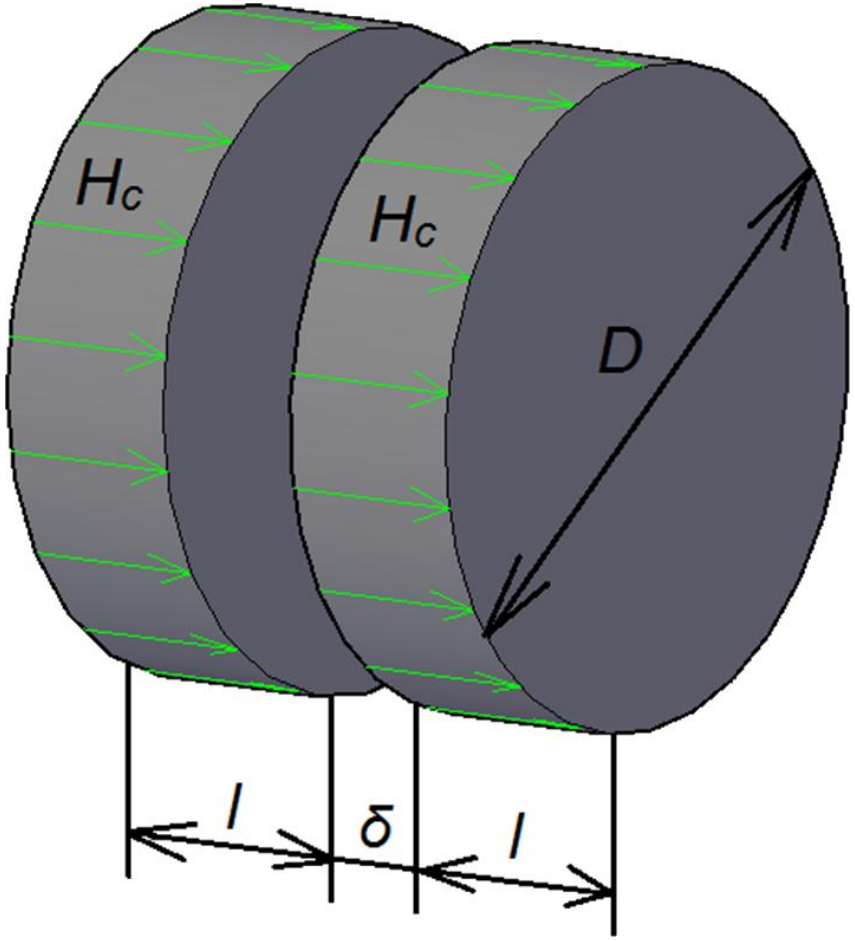


Given:

D = 15 mm,
l = 5 mm,
H_c = 955 000 A/m,
B_r = 1.3 T

Calculate field distribution on the axis, B[T]

2. Two magnets

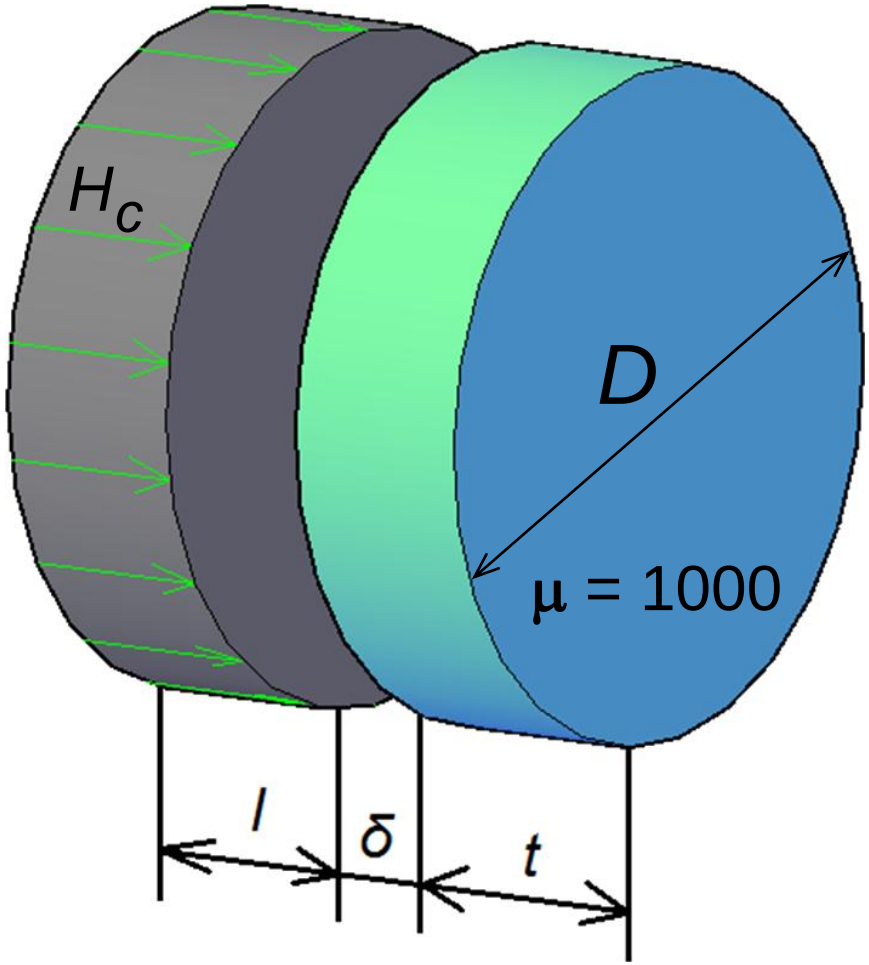


Given:

D = 15 mm,
l = 5 mm,
δ = 5 mm,
H_c = 955 000 A/m,
B_r = 1.3 T

Calculate repelling and attractive forces of the magnets, F[H]

3. Magnet and ferromagnetic.



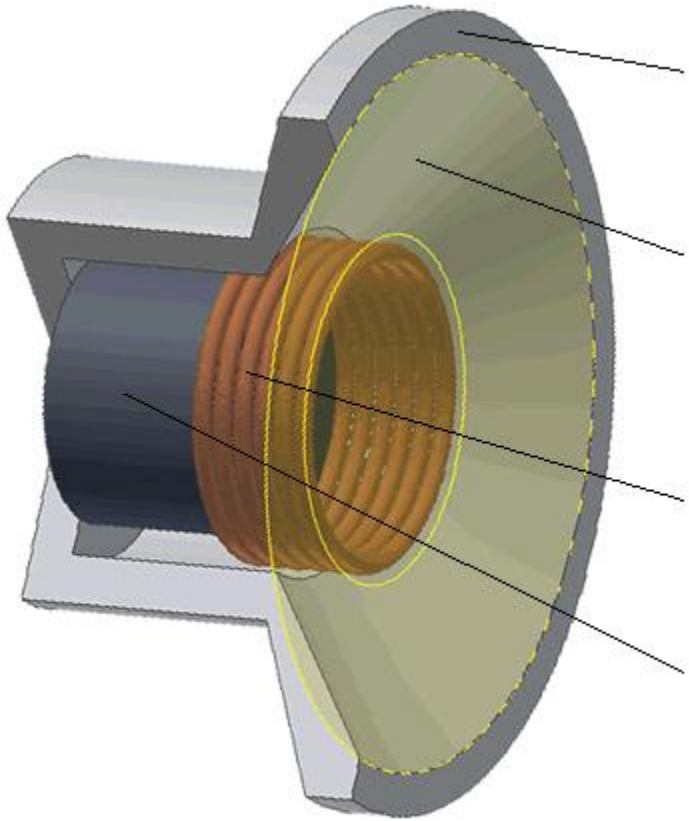
Given:

D = 15 mm,
l = 5 mm,
δ = 5 mm,
t = 5 mm,
H_c = 955 000 A/m,
B_r = 1.3 T
μ= 1000.

Calculate force of the magnet attraction to the ferromagnetic, F[H]

4. Magnet and direct current

Loudspeaker



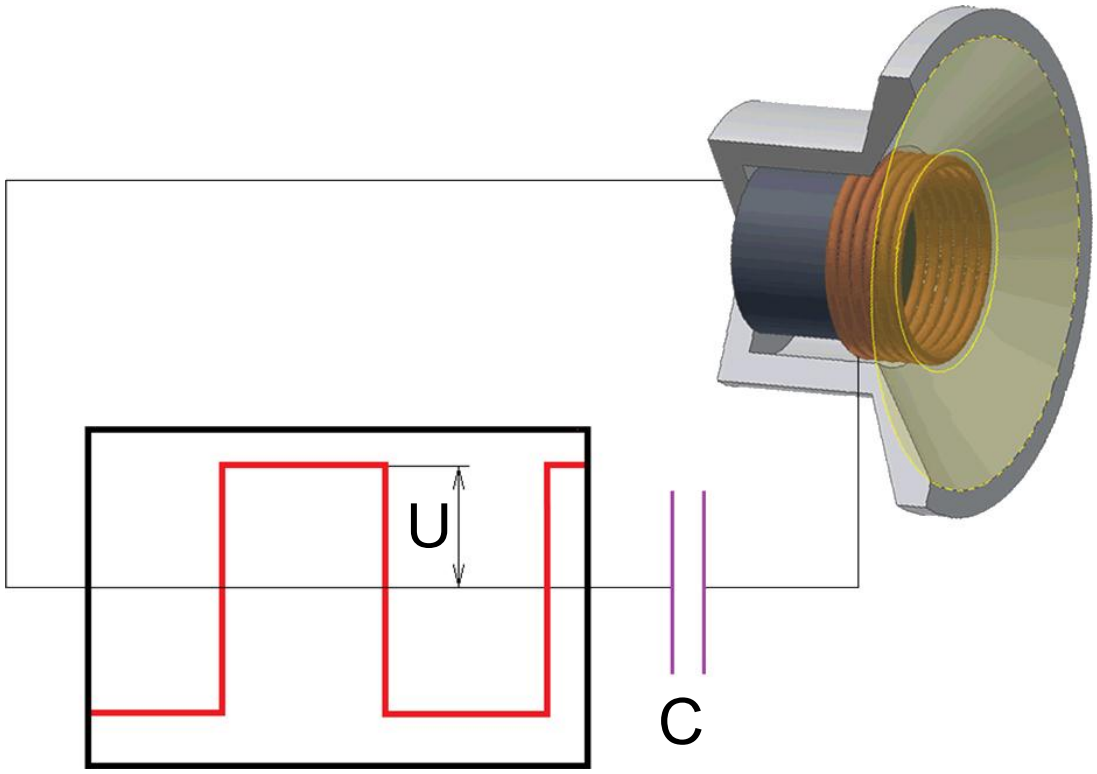
Given:

H_c = 500 000 A/m,
B_r = 0.65 T,
I = 0.1 A,
μ - *nonlinear*.

$$\Phi_{total} = \Phi_{PM} + \Phi_{coil}$$

$$L = \Phi_{coil} / i$$

5. Magnet and transient current

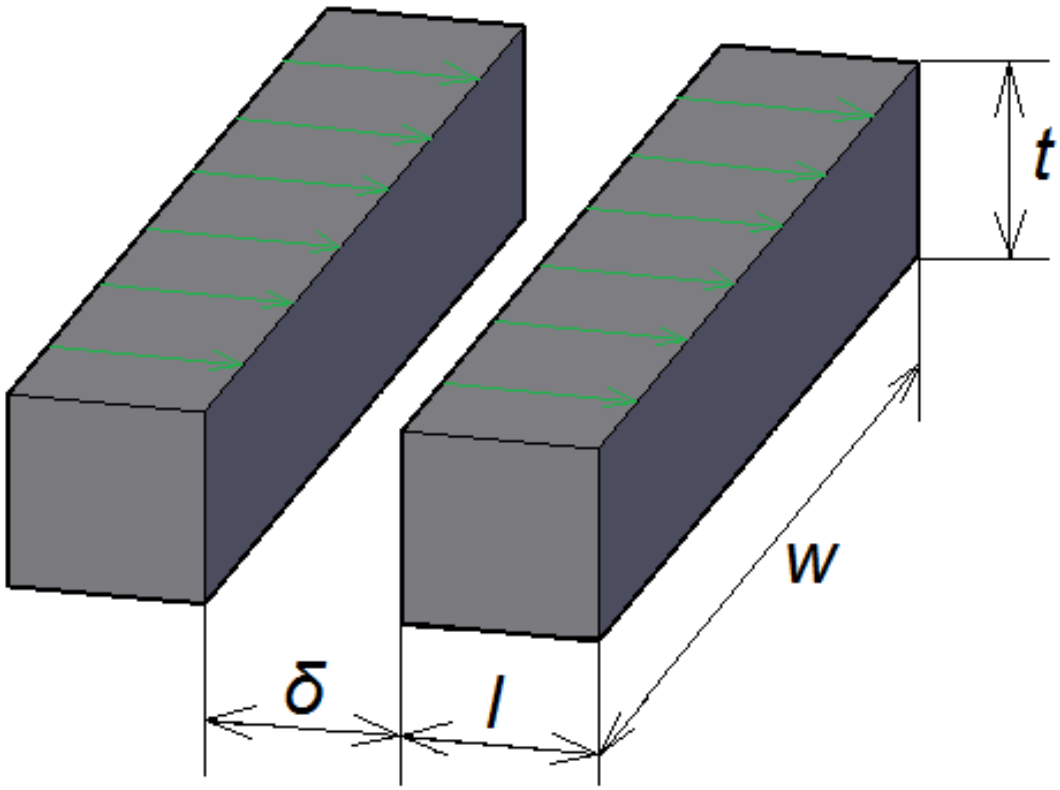


Given:

H_c = 500 000 A/m,
B_r = 0.65 T,
f = 10 kHz,
C = 2 μF,
U = 5 V.

Calculate force as a function of time, F[N]

6. Automation



Given:

l = 5 mm,
w = 20 mm,
t = 7.5 mm
H_c = 955 000 A/m,
B_r = 1.3 T

Calculate force of attraction as a function of the distance between magnets δ, F[H]

More information

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Applications>
Sample problems

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- Distributive examples
- Programming examples
- Step-by-step tutorials
- Verification examples

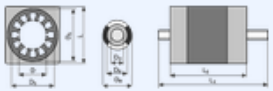
Examples gallery

Here is the full list of examples published on our website.

Search: permanent magnet Find

Pages: **1** 2

Thermal issues in the design of permanent magnet based electrical motors
Dr. Jose Camino



Model class: Plane-parallel
Analysis type: DC magnetics,Transient Heat Transfer
Application: electrical engineering,thermal engineering

Calculation of the temperature of the rotor under the different working conditions

Tags: motor,electric machine,temperature

Nonlinear permanent magnet
QuickField Support team