

AC Magnetic Analysis

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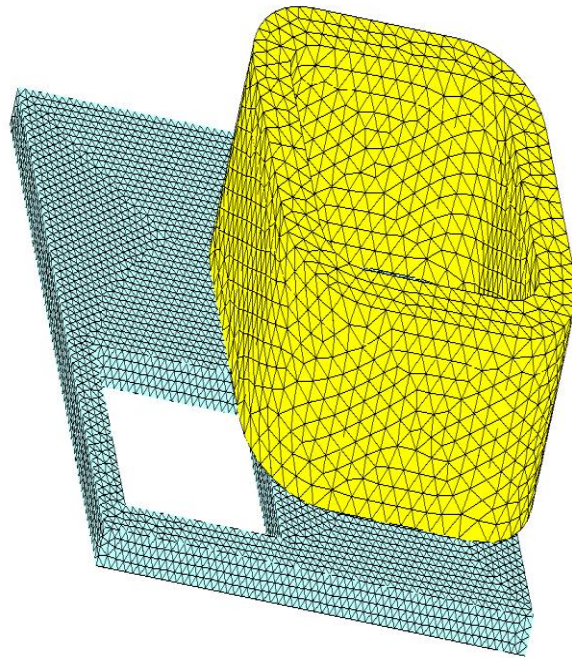
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1. Introduction

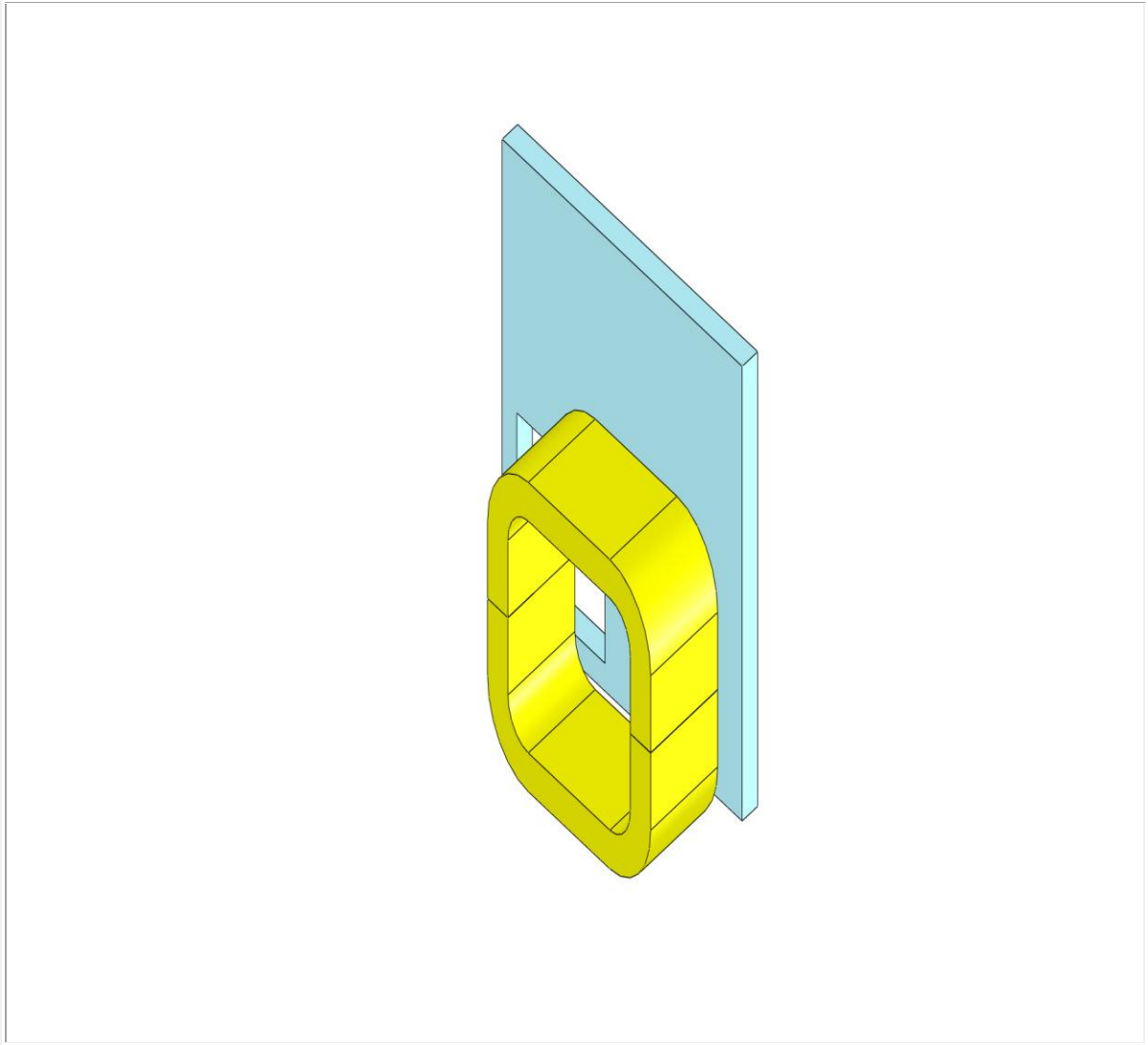
The model consists of a thick aluminum plate with an eccentric hole and an exciting coil. The entire structure will be modeled since it is asymmetrical

2. Model View

Team Problem 7_Current View (Mesh)



Team Problem 7_Isometric View



3. Materials

Note: R.P. stands for Relative Permeability

Nbr.	Part Name	Material Name	Permeability Type
1	Airb-1-Body 1 (Extrude1)	Air	Isotropic
2	Half Coil1-1-Body 1 (Extrude1)	Copper	Isotropic
3	Half Coil1-2-Body 1 (Extrude1)	Copper	Isotropic
4	Hole1-1-Body 1 (Extrude1)	Air	Isotropic
5	Outer Air-1-Body 1 (Cavity1)	Air	Isotropic
6	Plate-1-Body 1 (Cavity1)	AluminiumForAC	Isotropic

4. Coils Information

Coils					
Nb r.	Name	Nbr.Of Turns	Magnitude	Phase	Components & Bodies
1	Wound Coil - 1	100	1.944681e+001	0.0000e+000 deg	Half Coil1-1 Half Coil1-2

5. Study Properties

Mesh Information			
Nbr.Of Nodes	Nbr.Of Elements	Element Size (m)	Tolerance (m)
62338	372342	0.100000	0.000100

Mesh Controls information					
Nb r.	Name	Mesh Size	Size Unit	Components & Bodies	Selected Faces
1	MeshControl - 1	5.000000	mm	Plate-1	
2	MeshControl - 2	10.000000	mm	Half Coil1-1 Half Coil1-2 Airb-1 Hole1-1	

Solver information

Frequency (Hz)	Compute Circuit Parameters
5.000000e+001	Yes

6. Results Table

Inductance Results (H)

Coil Name	Wound Coil - 1
Wound Coil - 1	1.600453e-003

Flux Linkage Results

Coil Name	Flux Linkage (Wb)
Wound Coil - 1	0.000000e+000

Current Results

Coil Name	Current (A)
Wound Coil - 1	(1.944681e+001 , 0.000000e+000)

Impedance Results (Ohms)

Coil Name	Wound Coil - 1
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Wound Coil - 1	(1.709192e+000 , 5.027970e-001)
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Voltage Results

Coil Name	Voltage (V)
Wound Coil - 1	(3.312650e+001 , 9.654744e+000)

Losses Density Results

Solid Bodies	Ohmic Loss (W)
Half Coil1-1 - Body 1 (Extrude1)	8.406522e+000
Plate-1 - Body 1 (Cavity1)	4.338992e+000
Half Coil1-2 - Body 1 (Extrude1)	8.404570e+000

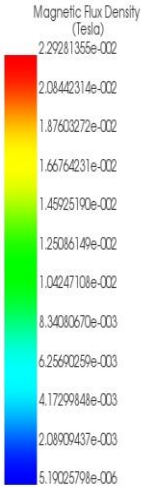
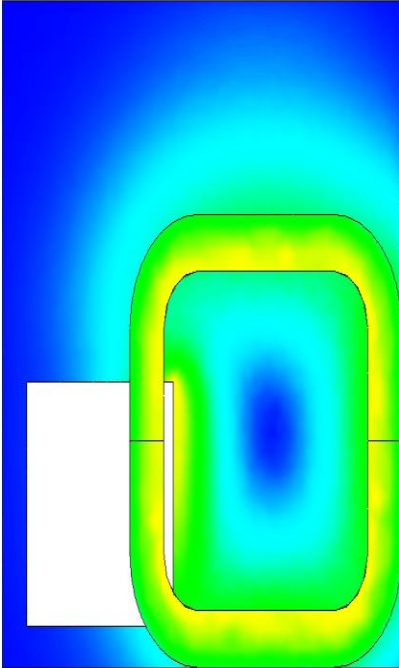
Energy Results

Energy (J)	Co-Energy (J)
3.026283e-001	0.000000e+000

7. Magnetic Flux Density Results

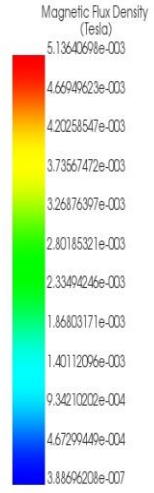
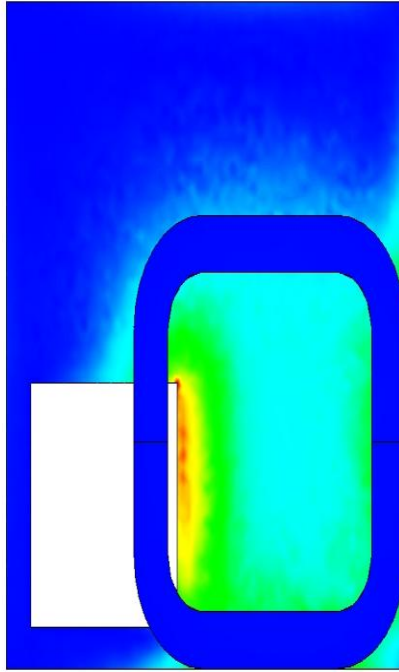
Magnetic Flux Density at wt=0

Model Name: Team Problem 7
Study Name: Study 1
Plot Name: Magnetic Flux Density at wt=0 (Resultant)
Part: Real
Phase: 0.000 degree



Magnetic Flux Density at wt=90

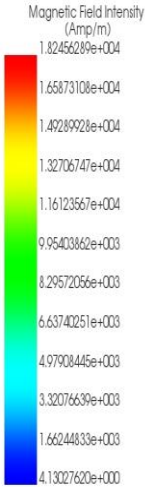
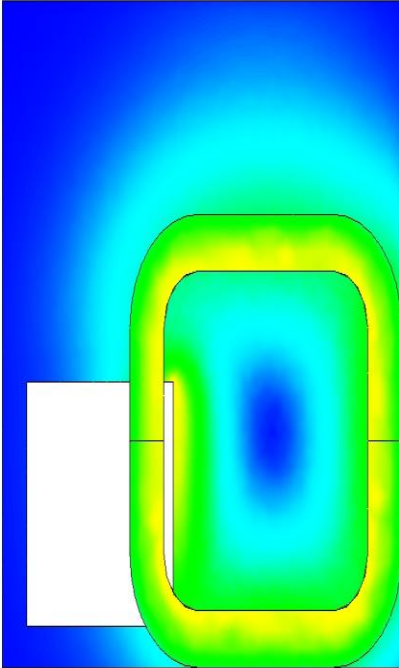
Model Name: Team Problem 7
Study Name: Study 1
Plot Name: Magnetic Flux Density at wt=90 (Resultant)
Part: Real
Phase: 90.000 degree



8. Magnetic Field Intensity Results

Magnetic Field Intensity - 1

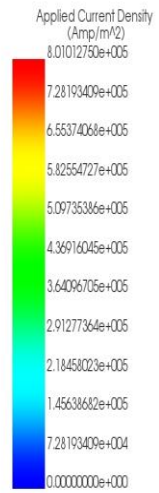
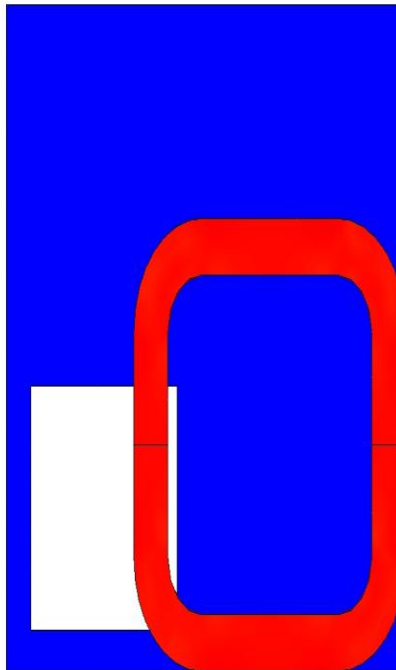
Model Name: Team Problem 7
Study Name: Study 1
Plot Name: Magnetic Field Intensity - 1 (Resultant)
Part: Real
Phase: 0.000 degree



9. Applied Current Density Results

Applied Current Density - 1

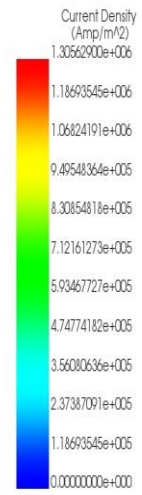
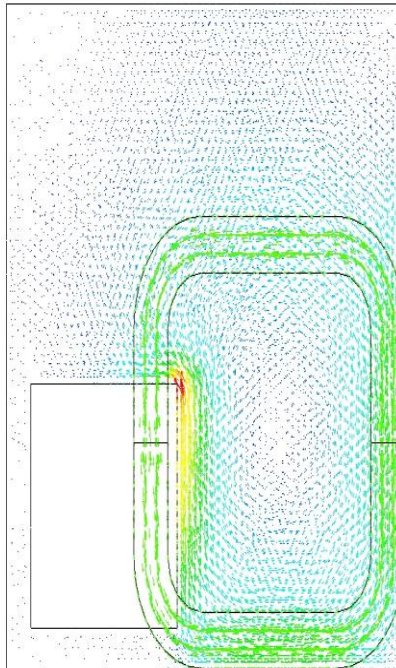
Model Name: Team Problem 7
Study Name: Study 1
Plot Name: Applied Current Density - 1 (Resultant)
Part: Real
Phase: 0.000 degree



10. Current Density Results

Current Density - 1

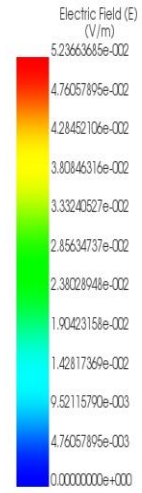
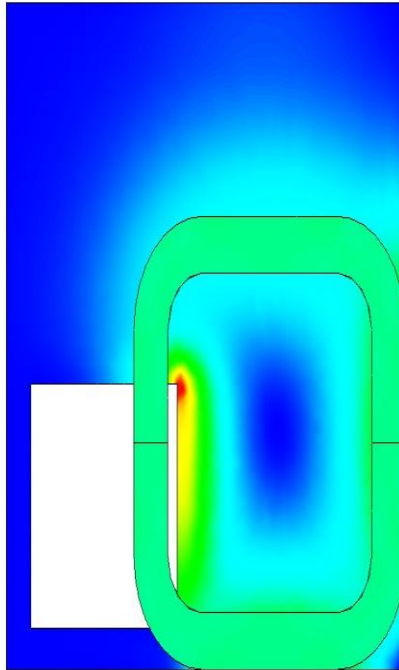
Model Name: Team Problem 7
Study Name: Study 1
Plot Name: Current Density - 1 (Resultant)
Part: Real
Phase: 0.000 degree



11. Electric Field Results

Electric Field - 1

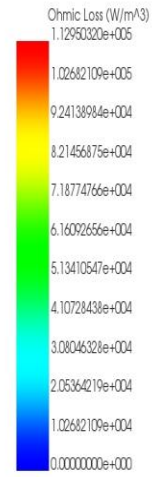
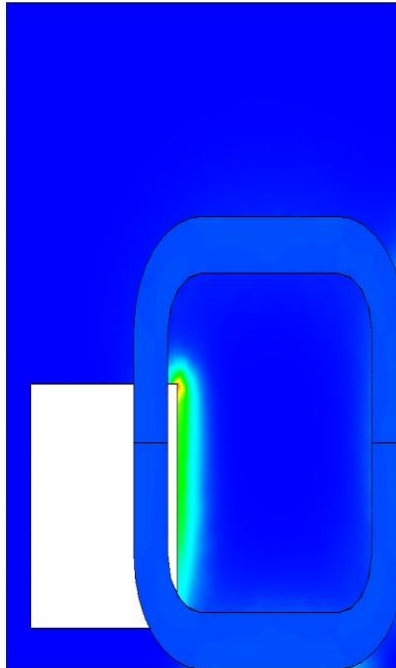
Model Name: Team Problem 7
Study Name: Study 1
Plot Name: Electric Field - 1 (Resultant)
Part: Real
Phase: 0.000 degree



12. Losses Results

Losses Density - 1

Model Name: Team Problem 7
Study Name: Study 1
Plot Name: Losses Density - 1 (Ohmic Loss)



13. Appendix

Material Name: Air

Permeability Type: Isotropic

Note: R.P. stands for Relative Permeability

R.P.	Conductivity(Mho/m)	Permanent Magnet	Thermal Conductivity (W/m.K)
0.000e+000	0.000e+000	No	2.400e-002

Material Name: Copper

Permeability Type: Isotropic

Note: R.P. stands for Relative Permeability

R.P.	Conductivity(Mho/m)	Permanent Magnet	Thermal Conductivity (W/m.K)
0.000e+000	5.700e+007	No	4.010e+002

Material Name: AluminiumForAC

Permeability Type: Isotropic

Note: R.P. stands for Relative Permeability

R.P.	Conductivity(Mho/m)	Permanent Magnet	Thermal Conductivity (W/m.K)
0.000e+000	3.526e+007	No	0.000e+000