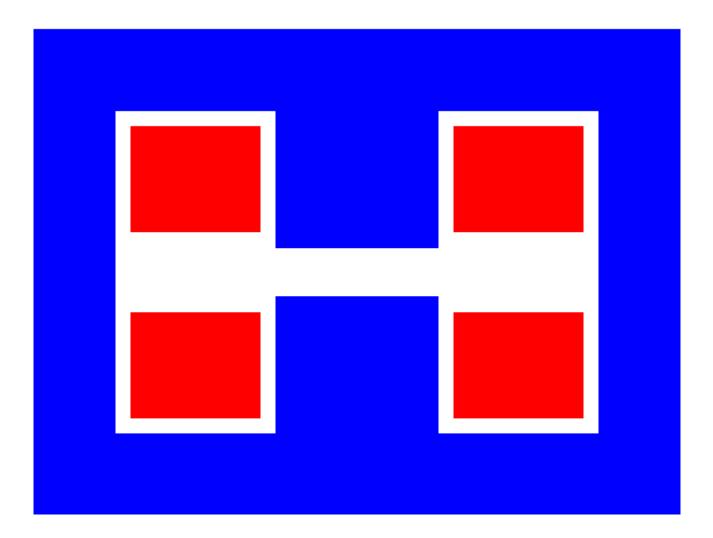
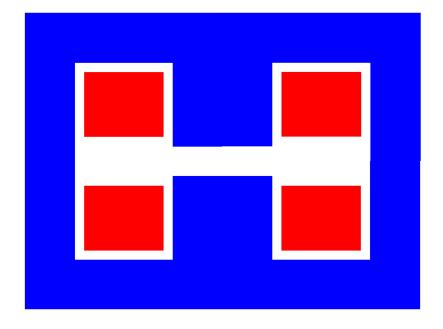
Lecture 8: Finite Elements Simulations

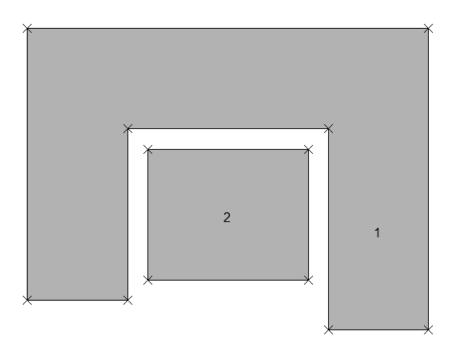
Mauricio Lopes – FNAL

Geometry



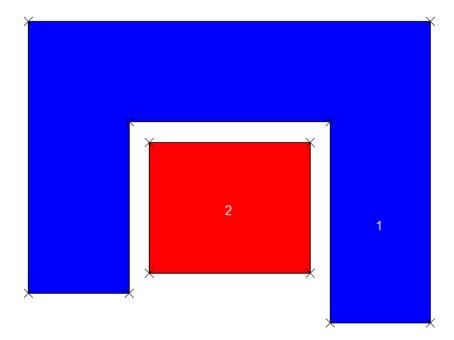


1) Reduce the model taking advantages of the symmetries



1) Reduce the model taking advantages of the symmetries

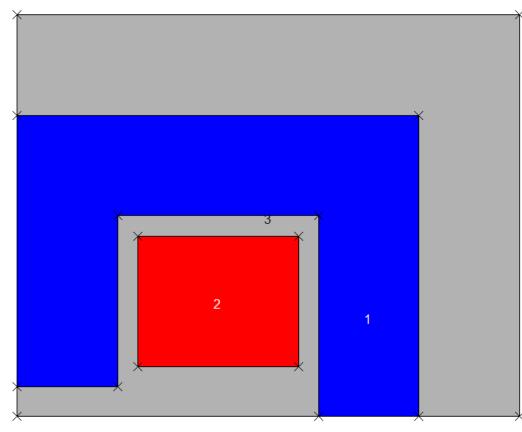
2) Define geometry regions



1) Reduce the model taking advantages of the symmetries

2) Define geometry regions

3) Define regions material properties

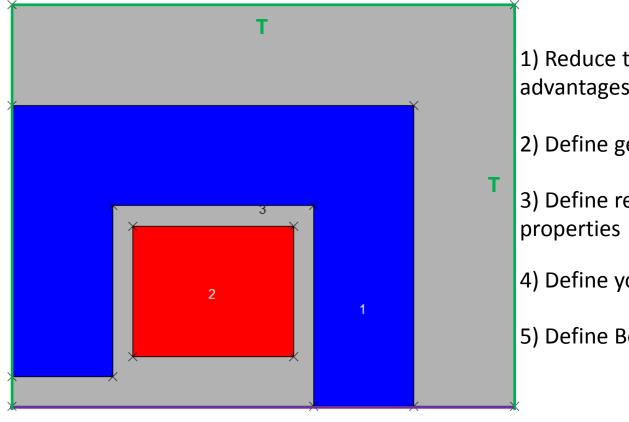


1) Reduce the model taking advantages of the symmetries

2) Define geometry regions

3) Define regions material properties

4) Define your "universe"



1) Reduce the model taking advantages of the symmetries

2) Define geometry regions

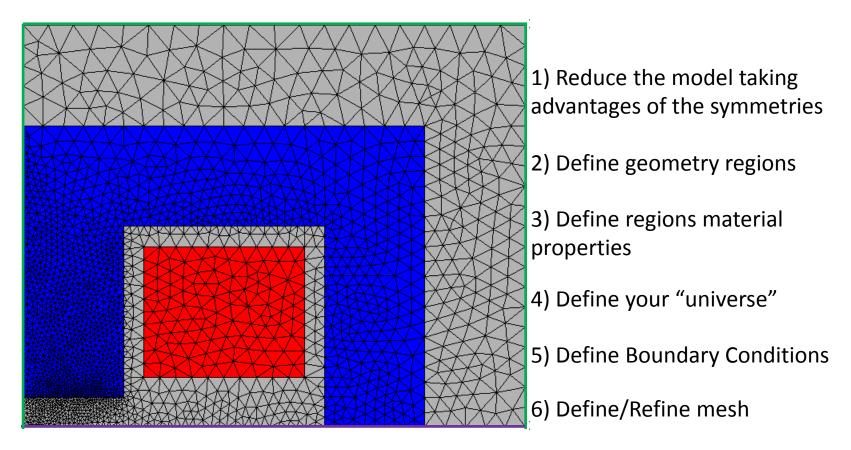
 Define regions material properties

4) Define your "universe"

5) Define Boundary Conditions

Ν

Т



Static analysis ? ×
Restart from current solution
Material type and iteration parameters
C Linear material analysis
Nonlinear material analysis
Iteration tolerance 1.0E-03
Number of nonlinear iterations 21
Newton-Raphson Simple
Demagnetization data
Demagnetization temperature BASE
Field type Magnetic Electric Lossy dielectric
Adaptive analysis Scale case list
Adaptive refinement
Number of refinement iterations
Maximum number of elements *
Final convergence accuracy (%) 5
OK Cancel

1) Reduce the model taking advantages of the symmetries

2) Define geometry regions

 Define regions material properties

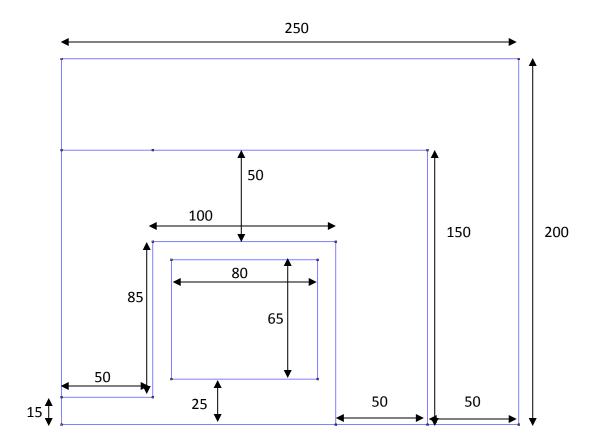
4) Define your "universe"

5) Define Boundary Conditions

6) Define/Refine mesh

7) Set simulations details (convergence criteria)

Hands-on Example



Tips

- Check your units. Be consistent with them.
- Check the boundary conditions.
- Check the polarity of your coils.
- Check the materials properties.
- Estimate the result and verify that it is correct.
- Optimize your mesh to refine the results.
- Simplify your model by removing unnecessary details.
- If the task involves repetitions with small variations, make use of scripts.
- Refer to Manual/Help File.