7 Finite Elements Simulations

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Geometry



US Particle Accelerator School – Austin, TX – Winter 2016



1) Reduce the model taking advantages of the symmetries



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2) Define geometry regions



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3) Define regions material properties





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Static analysis	? 🗙
Restart from current solution	
Material type and iteration parameters	
🗇 Linear material analysis	
Onlinear material analysis	
Iteration tolerance 1.0E-03	
Number of nonlinear iterations 21	
Newton-Raphson	
Demagnetization data	
Demagnetization temperature BASE	
Field type • Magnetic • Magnetic	
Adaptive analysis Scale case list	
Adaptive refinement	
Number of refinement iterations 0	
Maximum number of elements =	
Final convergence accuracy (%) 5	
OK Cancel	

1) Reduce the model taking advantages of the symmetries

2) Define geometry regions

3) 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



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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.