

# Design of Superconducting Magnets

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1. Introduction to electromagnetism and superconductivity, superconducting cables for applications
2. Approaches to electromagnetic design: a. solenoids, b. multipoles, c. other forms of winding (toroids), d. loadline and margin, e. field quality
3. Examples and exercises of magnetic design with FEA open access software
4. Approaches to mechanical design: a. mechanical properties of matter, b. causes of stress in the magnets: thermal contractions, c. causes of stress in magnets: Lorentz forces, d. stress management in solenoids, e. stress management in multipoles, f. Examples of magnetic design with FEA software
5. Ac losses
6. Stability
7. Quench and protection