The CERN Accelerator School

Contribution ID: **11**   Type: **not specified**

Magnetic field simulation by finite element methods

Tuesday 21 November 2023 09:30 (1 hour)

Stephan Russenschuck, Maxwell equations in global form, oriented manifolds, Ampere's law, Faraday's law, Gauss'law, conservation of charge. Maxwell equation in local form, Vector fields, application to NC magnets, material relations, boundary and interface conditions, space curves and their applications, CCT magnets, the directional derivative, grad, curl, and div, coordinate-free definition of the differential operators, Maxwell's house. Harmonic fields in 2D, solution of the boundary value problem in magnetostatics, co-homology, Green's function, the field of line currents, ideal distribution of currents in SC magnets, Forier and Taylor series, complex notation, holomorphic extension, Helmholtz coils, the magnetic double layer, the magnetic scalar potential of a current loop, the magnetic moment, forces and energy in non-linear circuits., Technology, Topical, Magnets, Superconductivity,

Presenter: DE GERSEM, Herbert