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Recent Advances in BELFEM and Toward a Community-Driven Material Database for HTS Modeling

Tuesday, 11 June 2024 15:30 (30 minutes)

We present the latest progress within the
BELFEM project, with a focus on the electromagneticthermal
modeling of high-temperature superconducting
cables and magnets. We discuss a recent validation and
benchmark against COMSOL and GetDP, and provide a
brief outlook onto current fields of research.
A primary challenge encountered in the accurate modeling
of such systems is the representation of material
properties, which are highly nonlinear and sensitive to
variations in magnetic field, temperature, and electrical
current. Based on the experience made in recent investigations,
we propose the development of a community-driven
material database where all datasets are regularized and
provided as B-Spline based lookup tables, thus offering a
fast and efficient way of providing the smooth derivatives,
which are highly beneficial for these nonlinear problems.

Topic

Innovative methods and tools for modelling large-scale HTS systems

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