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Numerical Considerations for Coupled Magneto-thermal FE Models of HTS Tapes

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The accurate prediction of AC losses in High- Temperature Superconducting (HTS) tapes has been widely discussed in the literature, as both homogenized and multi-scale models have been proposed using different magnetodynamic finite-element (FE) formulations. In this work, we discuss numerical considerations to be taken into account when coupling magnetic and thermal FE models. The validity of using homogenized models, the accuracy of the time-stepping procedure and the difference between monolithic and staggered coupling schemes are discussed. These considerations are illustrated for a 2D model of a racetrack coil made of several REBCO tapes, both during normal operation (no quench) and in thermal runaway.

Topic

Coupled and uncoupled multiphysics problems

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