

On Regularization for Magneto-thermal Problems

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Abstract

This paper studies the magneto-thermal problems with the nonlinear material law. The main difficulty is to analysis the Joule heating term $\gamma(u)|[\cdot]\times H|^2$. First, a regularized model is introduced. By time discretization, the well-posedness of the discrete problem is established, and the convergence of the solution as the time step size $\tau \rightarrow 0$ is deduced. Finally, the solution to the regularized problem converges to the original as $\epsilon \rightarrow 0$. The mathematical analysis of this paper provide a routine to obtain the well-posedness of the magneto-thermal problems and gives an answer to the open question from the previous work.

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