On the simulation of electromagnetic waves in magnetised plasmas

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Abstract

With the inception of fusion devices (ITER project), numerical simulation of electromagnetic waves in magnetised plasmas has become a popular topic. In this talk, we consider a time-harmonic model, which is discretized with the help of Nédélec’s H(curl)-conforming finite element. The variational formulation is ”barely” coercive, ie. the modulus of the coercivity constant of the sesquilinear form is very small compared to its continuity modulus. As a consequence, solving the problem numerically is challenging. In a first step, we carry out the numerical analysis of the problem and prove (optimal) convergence of the finite element method. Then, we report some numerical tests to highlight the difficulties to be addressed and discuss possible solutions to alleviate them.

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