

Adding a new finite element to FreeFem++: the example of edge elements

Marcella Bonazzoli bonazzoli@ljjl.math.upmc.fr
Post doc. Inria/LJLL

If a finite element is not available yet in FreeFem++, the user can add a new finite element by writing a C++ plugin that defines two main ingredients: the basis functions (and their derivatives), and an interpolation operator. In FreeFem++ the basis functions (and in some cases the coefficients of the interpolation operator) are constructed locally, i.e. in each simplex of the mesh, without the need of a transformation from the reference simplex. The interpolation operator requires degrees of freedom and basis functions in duality.

Here we focus on the example of Nédélec edge finite elements, which are suited for the approximation of the electric field in Maxwell's equations