Regularity for Maxwell's equations on Lipschitz domains

Martin Costabel *

Abstract

As energy spaces for the variational formulation of Maxwell's equations, one commonly uses the Hilbert spaces X_N and X_T consisting of square integrable vector fields on a domain Omega whose curl and divergence are also square integrable and which have vanishing tangential or normal trace on the boundary. It has been known since the 1950s that X_N and X_T are contained in the Sobolev space H^1 if Omega has a smooth boundary ("Gaffney's inequality"), but not if Omega has corners. For Lipschitz domains the regularity H^s with $s = 1/2$ has been proved in the 1990s, whereas for a polyhedron one knows that this regularity is always true for some s strictly larger than 1/2. Recently a domain was found that is even C^1 and where this improved regularity is not true. In the talk I will describe the construction of this domain.

*IRMAR, Institut Mathématique Université de Rennes 1