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On well posedness of mixed problems for Maxwell's equations II

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§ 0. Introduction and main result

The purpose of this paper is to give an extension of the result in a preceding paper [5] to the case where boundary conditions are not necessarily real.

Let us consider the mixed problem for the system P of Maxwell's equations:

$$(P, B)\qquad \begin{cases} P\begin{bmatrix} E \\ H \end{bmatrix}=f & \text{in } (0, \infty)\times G, \\ B\begin{bmatrix} E \\ H \end{bmatrix}=0 & \text{on } (0, \infty)\times \partial G, \\ E(0, x)=H(0, x)=0 & \text{for } x\in G, \end{cases}$$

where

$$(0.1)\qquad P\left(\frac{\partial}{\partial t}, \frac{\partial}{\partial x}\right)=\frac{\partial}{\partial t}+\begin{bmatrix} 0 & -\text{curl} \\ \text{curl} & 0 \end{bmatrix}$$

which will be often denoted by $\frac{\partial}{\partial t}+\sum_{j=1}^{3} A_j\frac{\partial}{\partial x_j}$, G is an open subset of $\boldsymbol{R}^3$ with C^∞ boundary ∂G and $B(t, x)$ is a C^∞ complex 2×6 matrix function defined on $\boldsymbol{R}^1\times\partial G$ which is of rank two everywhere and is constant for $|t|+|x|$ sufficiently large. It is assumed, as in [5], that the problem (P, B) is *reflexive*, i.e., the kernel of $B(t, x)$ contains that of the boundary matrix $A_\nu(x)=\sum_{j=1}^{3}\nu_j(x)A_j$ at each $(t, x)\in\boldsymbol{R}^1\times\partial G$, where $\nu={}^t(\nu_1, \nu_2, \nu_3)$ is the inner unit normal to ∂G.

When B is real we proved in [5] the following: If the frozen problem $(P, B)_{(t^0,x^0)}$ at an arbitrary boundary point $(t^0, x^0)\in\boldsymbol{R}^1\times\partial G$ (by this we mean the constant coefficients problem (P, B) with B replaced by the constant matrix $B(t^0, x^0)$ and G by the half space $\{x\in\boldsymbol{R}^3;\ \nu(x^0)\cdot x>0\}$) satisfies Kreiss' condition (or the uniform Lopatinskii condition), then the kernel of $B(t^0, x^0)$