Some remarks about the Maxwell equations

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Abstract:

After a short introduction, time harmonic electromagnetic fields are considered and corresponding boundary value problems. Then I refer to Rainer Kress's results on the treatment of multiply connected domains. Also two variational formulations for the cavity problem with Dirichlet boundary conditions are analized, namely R. Picard's extended Maxwell-Heaviside system, and weak variational formulations with Hodge decompositions of the spatial fields and the boundary charges. For the latter boundary integral equations based on the Stratton-Chu representation formulas are formulated. With Rumsey's principle and corresponding Hodge decomposition of the boundary fields lead to a Gårding inequality for the variational formulation. Hence, corresponding finite and boundary element Galerkin approximations are asymptotically stable and convergent for increasing degrees of freedom.