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Existence, uniqueness and regularity for solutions of the conical diffraction problem

It is shown that Maxwell's equations for the diffraction of a time–harmonic oblique incident plane wave by periodic interfaces can be reduced to a transmission problem for a system of two Helmholtz equations in the plane. We obtain existence and uniqueness results for solutions corresponding to electromagnetic fields with locally finite energy. The analysis is based on a strongly elliptic variational formulation of the differential problem in a bounded periodic cell involving nonlocal boundary operators. Special attention is paid to the regularity and leading asymptotics of solutions near the edges of the interface. The results are joint work with R. Hinder, F. Penzel and G. Schmidt.