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Decomposition of $H_{div}^{-1/2}(\Gamma)$ and nature of Steklov-Poincaré operator of exterior electromagnetism problem. (Décomposition de $H_{div}^{-1/2}(\Gamma)$ et nature de l'opérateur de Steklov-Poincaré du problème extérieur de l'électromagnétisme.) (French) Zbl 0767.35094
C. R. Acad. Sci., Paris, Sér. I 316, No. 4, 369-372 (1993).

Summary: We show that, if Γ is diffeomorphic to S^2 , then $H_{div}^{-1/2}(\Gamma)$ is splitted into

$$\nabla_{\Gamma}(H^{3/2}(\Gamma))_{\oplus}^{\perp} \text{rot}_{\Gamma}(H^{1/2}(\Gamma)).$$

Then we show that the Steklov-Poincaré operator for the exterior electromagnetism problem, which maps the tangential component $E \wedge n$ of the electric field to the electric current j is the direct sum of an operator going from $\nabla_{\Gamma}(H^{3/2}(\Gamma))$ to $\text{rot}_{\Gamma}(H^{1/2}(\Gamma))$ and an operator going from $\text{rot}_{\Gamma}(H^{1/2}(\Gamma))$ to $\nabla_{\Gamma}(H^{3/2}(\Gamma))$ modulo a regularizing operator.

MSC:

- 35Q60 PDEs in connection with optics and electromagnetic theory
- 78A45 Diffraction, scattering
- 31A10 Integral representations, integral operators, integral equations methods in two dimensions

Cited in **8** Documents

Keywords:

structure of Sobolev spaces; Steklov-Poincaré operator