

ON POINCARÉ EQUATION

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Let $\Omega \subset \mathbb{R}^n$ be a bounded domain such that $\partial\Omega \subset C^1$. The following theorem is well known.

Theorem 1. If $f \in L^2(\Omega)$, then there exists a unique weak solution $u \in H_0^1(\Omega)$ of the following problem

$$\Delta u = f(x), \quad x \in \Omega, \quad (1)$$

$$u|_{\partial\Omega} = 0. \quad (2)$$

Under the additional conditions we prove some properties of the function u from Theorem 1. Using methods from [1], we apply obtained results to the Computer Vision problems.

1. Aubert G., Kornprobst P. *Mathematical Problems in Image Processing: Partial Differential Equations and the Calculus of Variations*. New York: Springer, 2006.