

Singularities in PDE and the calculus of variations

Singularités en EDP et dans le calcul des variations

17–21 *july/juillet*, 2006

• POSTERS •

Regularity of a type of free boundary problem with volume constraint

Huiqiang Jiang

`hqjiang@math.umn.edu`

School of Mathematics

University of Minnesota

127 Vincent Hall

206 Church St. S.E.,

Minneapolis, MN 55455

USA

Abstract

Let Ω be a bounded domain in \mathbb{R}^n , $n \geq 2$ and $\Sigma \subset \mathbb{R}^p$ be a smooth manifold. We use \mathcal{M}_Ω to denote the collection of all pairs of (A, u) such that $A \subset \Omega$ is a set of finite perimeter and $u \in H^1(\Omega; \mathbb{R}^p)$ satisfies

$$u(z) \in \Sigma \quad \text{a.e. } x \in A.$$

We consider the energy functional

$$E_\Omega(A, u) = \int_\Omega |\nabla u|^2 + P_\Omega(A)$$

defined on \mathcal{M}_Ω , where $P_\Omega(A)$ denotes the perimeter of A inside Ω . Let $(A, u) \in \mathcal{M}_\Omega$ be a minimizer with volume constraint. We will consider regularity of the free boundary in different settings.