

SYMMETRY BREAKING IN CONSTRAINED CHEEGER TYPE ISOPERIMETRIC INEQUALITY

FRANCESCO DELLA PIETRA (UNIVERSITÀ DEGLI STUDI DEL MOLISE)

Joint work with B. Brandolini, C. Nitsch and C. Trombetti (Università degli studi di Napoli “Federico II”)

ABSTRACT. The aim of the talk is to present some results on the optimal constant $C(\Omega)$ in the Sobolev inequality

$$\|u\|_{L^q(\Omega)} \leq C(\Omega) \|Du\|(\mathbb{R}^n)$$

$1 \leq q < 1^*$, for BV function which are zero outside Ω and with zero mean value inside Ω . The study of $C(\Omega)$ leads to the definition of a Cheeger type constant. We are interested in finding the best possible embedding constant in terms of the measure of Ω alone. We set up an optimal shape problem and we completely characterize, on varying the exponent q , the behavior of optimal domains. Among other things we establish the existence of a threshold value $1 \leq \tilde{q} < 1^*$ above which the symmetry of optimal domains is broken. Significant differences between the cases $n = 2$ and $n \geq 3$ are emphasized.