UNIVERSIDADE DE LISBOA
CENTRO DE MATEMÁTICA E APLICAÇÕES FUNDAMENTAIS
Av. Prof. Gama Pinto 2, 1649-003 LISBOA, PORTUGAL   Tel. (351) 217 904 700 FAX (351) 217 954 288

Mês de: OUTUBRO 2012

SEMINÁRIO DE ANÁLISE E EQUAÇÕES DIFERENCIAIS

Dia 11 de Outubro (quinta-feira), às 13h30, na Sala B3-01

A Curvature Operator from Maxwell-Born-Infeld Field Theory

Denis Bonheure

(Université Libre de Bruxelles)

Abstract:

We show that the quasilinear equation

$$-\mathrm{div}\left(\frac{\nabla u}{\sqrt{1-|\nabla u|^2}}\right) = |u|^{\alpha-2}u, \quad \text{in } \mathbb{R}^N$$

has a positive smooth radial solution at least for any $\alpha > 2^\star = 2N/(N-2)$, $N \geq 3$. Our approach is based on the study of the optimizers for the best constant in the inequality

$$\int_{\mathbb{R}^N} (1-\sqrt{1-|\nabla u|^2}) \geq C\left(\int_{\mathbb{R}^N} |u|^\alpha\right)^{\frac{N}{\alpha+N}},$$

which holds true in the unit ball of $W^{1,\infty}(\mathbb{R}^N) \cap \mathcal{D}^{1;2}(\mathbb{R}^N)$ if and only if $\alpha \geq 2^\star$. We also prove that the best constant is not achieved for $\alpha = 2^\star$. As a byproduct, our arguments combined with Lusternik-Schnirelmann category theory allow to construct a sequence of radial solutions.

Local:
Instituto para a Investigação Interdisciplinar da Universidade de Lisboa
Av. Prof. Gama Pinto, 2
1649-003 Lisboa