Centro de Investigação em Matemática e Aplicações
Departamento de Matemática

Seminário

Segunda-feira, 23 de julho de 2012
CLAV, sala 126 às 14:30 horas

Dimensional reduction for $-\Delta_1$[1]

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[1] joint work with Maria Emilia Amendola and Giuliano Gargiulo

Resumo

It is studied the 3D-2D dimensional reduction for $-\Delta_1$ and a power-law approximation is also provided in terms on $-\Delta_p$ as $p \to 1$.

We study the asymptotic behaviour, both for $\varepsilon \to 0$ and $p \to 1$ of $p - harmonic$ functions in thin domains of the type $\Omega_\varepsilon : \omega \times \left(-\frac{\varepsilon}{2}, \frac{\varepsilon}{2}\right)$, with prescribed boundary data u_0 on the lateral boundary of $\Omega_\varepsilon := \partial\omega \times \left(-\frac{\varepsilon}{2}, \frac{\varepsilon}{2}\right)$, i.e.

$$\begin{cases} -\Delta_p v := -\mathrm{div}(|\nabla v|^{p-2}\nabla v) = 0 & \text{in } \Omega_\varepsilon, \\ v \equiv v_0 & \text{on } \partial\omega \times \left(-\frac{\varepsilon}{2}, \frac{\varepsilon}{2}\right), \\ |\nabla v|^{p-2}\nabla v \cdot \nu = 0 & \text{on } \omega \times \left\{-\frac{\varepsilon}{2}, \frac{\varepsilon}{2}\right\}. \end{cases} \tag{1}$$

Equivalently one may think of studying as $\varepsilon \to 0$ and $p \to 1$, the associated Dirichlet integral, namely

$$\frac{1}{\varepsilon}\int_{\Omega_\varepsilon} |\nabla v|^p dx \tag{2}$$

among all the fields $v \in W^{1,p}(\Omega_\varepsilon)$, with $v \equiv v_0$ on $\partial\omega \times \left(-\frac{\varepsilon}{2}, \frac{\varepsilon}{2}\right)$.