

UNIVERSIDADE FEDERAL DE SÃO CARLOS  
DEPARTAMENTO DE MATEMÁTICA

COLÓQUIO 2015

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Falará sobre

Fast/Slow Diffusion and Applications

We regard the limit as  $p \rightarrow \infty$  of the flow governed by the  $p$ -Laplacian as providing a simplistic model for the ‘collapse of an initially unstable sandpile’. Upon rescaling to stretch out the initial layer we obtain some simple dynamics and provide fairly explicit solutions in certain cases. In particular we note that such models entail ‘instantaneous’ mass transfer governed by Monge-Kantorovich theory. The mathematical issue is to understand the behaviour of the solution  $u_p$  of the initial value problem

$$\begin{cases} \partial_t u_p - \Delta_p u_p = 0 & \text{on } (0, \infty) \times \mathbb{R}^d, \\ u_p(0, x) = g(x) & \text{in } \{t = 0\} \times \mathbb{R}^d, \end{cases}$$

in the ‘infinitely fast/infinitely slow diffusion’ limit  $p \rightarrow \infty$ . Here,  $1 \leq p < \infty$  and the initial data  $u_p(0, x) = g(x)$  are Lipschitz continuous, non-negative and have compact support.

Quarta-feira, 21 de outubro, às 16h no Auditório