Centro de Investigação em Matemática e Aplicações
Departamento de Matemática

Seminário

28 de Junho de 2011, Terça-feira
CLAV – Anf. 1 - 14:00 horas

Applications to the differential calculus to nonlinear parabolic operators

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Resumo

We consider the Cauchy-Dirichlet problem for second order quasilinear non-divergence form parabolic equation with discontinuous data

$$\begin{cases} D_t u - \sum_{ij=1}^{n} a^{ij}(x,t,u,Du) D_{ij} u = f(x,t,u,Du) & \text{a.e. in } Q \\ u = 0 & \text{on } \partial Q \end{cases}$$

Introducing suitable structure and regularity conditions we show local in time strong solvability of the above problem. As an illustration some known global existence results for operators having particular form are presented. Fixing a solution $u_0 \in W_p^{2,1}(Q), p > n+2$ in the coefficients and taking the Fréchet derivative of the operator at u_0 we obtain formally a linear non degenerate problem. This permits to apply the Implicit Function Theorem getting such that for all small perturbations of $\{\mathfrak{a}^{ij}\}$ and f there exists, locally in time, exactly one solution u close to u_0 in $W_p^{2,1}$, which depends smoothly on the data. For that, no structure and growth conditions are needed and the perturbations of the data can be general L^∞-functions in x and t. Moreover, applying the Newton Iteration Procedure we obtain an approximating sequence $\{u_k\}_{k=1}^{\infty}$ for the solution u_0, such that $\|u_k - u_0\|_{W_p^{2,1}} \to 0$ as $k \to \infty$ for any $p > n+2$.