

Mathematisches Kolloquium am 26.01.2012
15:00 Uhr, Ulmenstraße 69, Haus 3, HS 228

Vortragender: Prof. Dr. Jacques Giacomoni
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**Titel: A Review of Recent Results about Singular
and Quasilinear Parabolic Equations**

ABSTRACT:

In this talk, we will mainly be concerned by the following problem (arising in non-Newtonian flow models):

$$(P_t) \begin{cases} u_t - \Delta_p u = \frac{1}{u^\delta} + f(x, u) & \text{in } Q_T \stackrel{\text{def}}{=} (0, T) \times \Omega \\ u = 0 & \text{on } \Sigma_T = [0, T] \times \partial\Omega, \quad u > 0 \text{ in } Q_T \\ u(0, x) = u_0(x) & \text{in } \Omega \end{cases}$$

- i) Ω is a bounded domain in \mathbb{R}^N with smooth boundary,
- ii) $1 < p < \infty$, $\Delta_p u \stackrel{\text{def}}{=} \nabla \cdot (|\nabla u|^{p-2} \nabla u)$, $0 < \delta (< 2 + \frac{1}{p-1})$, $T > 0$, $u_0 \in L^\infty(\Omega) \cap W_0^{1,p}(\Omega)$.
- iii) $f : (x, s) \in \Omega \times \mathbb{R}^+ \rightarrow f(x, s)$ bounded below Carathéodory function, locally Lipschitz with respect to s uniformly in $x \in \Omega$ and *asymptotically sub-homogeneous*, i.e.

$$(1) \quad \limsup_{t \rightarrow +\infty} \frac{f(x, t)}{t^{p-1}} < \lambda_{1,p}(\Omega).$$

we will discuss the following issues:

- . Existence and uniqueness of *weak* solutions,
- . Regularity of weak solutions (strong solutions?, mild solutions?),
- . Long time behaviour for global solutions and stabilization.

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