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SEMINÁRIO DE ANÁLISE E EQUAÇÕES DIFERENCIAIS

Dia 4 de Novembro (quinta-feira), às 14h15, na Sala B3-01

"Wave equations with *p(x,t)*-Laplacian: Existence and Blow-up"

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(CMAF)

Abstract:

Let $\Omega \subset \mathbb{R}^n$ be a bounded domain with Lipschitz-continuous boundary Γ and $Q_T = \Omega \times (0,T]$. We consider the problem

$$u_{tt} = div\left(a(x,t)\,|\nabla u|^{p(x,t)-2}\,\nabla u\right) + \alpha \triangle u_t + b(x,t)|u|^{\sigma(x,t)-2}u, \quad (x,t) \in Q_T, \tag{1}$$

$$u(x,0) = u_0(x),\ u_t(x,0) = u_1(x),\ x \in \Omega, \tag{2}$$

$$u|_{\Gamma_T} = 0,\ \Gamma_T = \partial\Omega \times (0,T), \tag{3}$$

The exponents $p(x,t)$, $\sigma(x,t)$, the coefficients $a \equiv a(x,t)$, $b \equiv b(x,t)$ are given functions of their arguments and $\alpha = const > 0$. It is assumed that

$$0 \le a_- \le a(x,t) \le a_+ \le \infty, |a_t| \le C_a, \tag{4}$$

$$1 < p_- \le p(x,t) \le p_+ < \infty, \tag{5}$$

$$|p_t| = -p_t \le C_p, \tag{6}$$

$$1 < \sigma_- \le \sigma(x,t) \le \sigma_+ \le \infty, 0 \le \sigma_t \le C_\sigma, \tag{7}$$

$$0 \le b(x,t) \le b_+,\ 0 \le b_t, \tag{8}$$

$$u_0 \in L^2(\Omega) \cap W^{1,p(\cdot,0)},\ u_1 \in L^2(\Omega),\ f \in L^2(Q_T). \tag{9}$$

We discuss the questions of existence (local and global with respect to time) and blow up of energy solutions to the problem (1)-(3). The main attention is paid to the blow up effects caused by the variable nonlinearity of the equation under study. The analysis is based on the methods developed in [1, 2, 3].

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