SEMINÁRIO

ANÁLISE E EQUAÇÕES DIFERENCIAIS

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CMAFcIO

EXISTENCE AND DECAY RATES OF L^2 NORMS FOR A GENERALIZED SEMILINEAR DISSIPATIVE EQUATION OF BOUSSINESQ/PLATE TYPE.

Ruy Coimbra Charão
(Federal University of Santa Catarina)

ABSTRACT. we study existence, uniqueness and asymptotic behavior of solutions to the following Cauchy problem for a generalized second order semilinear equation of Boussinesq/Plate type under effects of a fractional dissipation

$$\begin{cases} u_{tt} + (-\Delta)^{\delta} u_{tt} + (-\Delta)^{\alpha} u + (-\Delta)^{\theta} u_t = \beta(-\Delta)^{\gamma}(f(u)), \\ u(0,x) = u_0(x), \\ u_t(0,x) = u_1(x), \end{cases} \tag{1}$$

where $\beta \neq 0$ is a real constant, $u = u(t,x)$ with $(t,x) \in (0,\infty) \times \mathbb{R}^n$ and the exponents of the Laplacian operators are constants satisfying $0 \leq \delta \leq \alpha$, $0 \leq \theta \leq \dfrac{\alpha+\delta}{2}$ and $\min\{\, 0,\ \dfrac{\alpha}{2} - \dfrac{n}{4}\} \leq \gamma \leq \dfrac{\alpha+\delta}{2}$. The nonlinearity f behaves as $f(s) = s^p$ with $p > 1$. To show that the decay rates are optimal we use an asymptotic expansion of the solution in the Fourier space.

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