Universidade Federal de São Carlos
Departamento de Matemática

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Falará sobre

Fujita versus Strauss - a never ending story

A lot of papers are devoted to the critical exponent $p_{crit}(n)$ in Cauchy problems for the semilinear wave model with power-nonlinearity. The model we have in mind is ($(t, x) \in [0, \infty) \times \mathbb{R}^n$)

$$u_{tt} - \Delta u + bu_t + m^2 u = |u|^p, \ \ u(0, x) = \varphi(x), \ \ u_t(0, x) = \psi(x).$$

Here b and m^2 are nonnegative constants. Critical exponent means, that for some range of $p \geq p_{crit}(n)$ we have the global (in time) existence of small data Sobolev solutions. On the contrary, for $1 < p \leq p_{crit}(n)$ we have blow-up for Sobolev solutions under special assumptions for the data.

If $b = m^2 = 0$, then $p_{crit}(n) = p_0(n)$ is the well-known *Strauss exponent*. If $b = 1$ and $m^2 = 0$, then $p_{crit}(n) = p_{Fuj}(n)$ is the well-known *Fujita exponent*. In the talk we discuss a special semilinear wave model with scale-invariant time-dependent mass and dissipation and power-nonlinearity. We show how a competition between the Fujita exponent and Strauss exponent comes into play. For a family of models we propose a new critical exponent. This is a joint project with Alessandro Palmieri (Freiberg).

References:
[1] *Nunes W., Palmieri A., Reissig M.* Semi-linear wave models with power non-linearity and scale-invariant time-dependent mass and dissipation. Mathematische Nachrichten 290 (2017), 1779–1805.
[2] *Palmieri A., Reissig M.* Semi-linear wave models with power non-linearity and scale-invariant time-dependent mass and dissipation, II. Mathematische Nachrichten 291 (2018), 1859–1892.

[3] *Palmieri A., Reissig M.* Fujita versus Strauss - a never ending story. 39 pp., accepted for publication in Journal of Differential Equations.

Data: 14 de novembro de 2018
Horário: 16h
Local: Auditório do DM