

SEMINÁRIO DE ANÁLISE E EQUAÇÕES DIFERENCIAIS

Dia 15 de Março (quinta-feira), às 13H30, na sala 6.2.33

Uniqueness and generic singularities of solutions to some nonlinear wave equations

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Abstract

Even for smooth initial data, it is well known that solutions to nonlinear hyperbolic PDEs can develop singularities in finite time. As a consequence, uniqueness and continuous dependence on initial data require a more careful analysis. This talk will focus on some classes of one-dimensional wave equations, including the Camassa-Holm and the variational wave equation $u_{tt} - c(u)(c(u)u_x)_x = 0$. For conservative solutions, uniqueness can be established by a suitable refinement of method of characteristics, accounting for energy conservation. Using Thom's transversality theorem, one can show that, for "almost all" initial data (in a topological sense), the solutions of these wave equations are smooth outside a locally finite number of curves in the $t - x$ plane. A detailed asymptotic description of the various types of singularities can also be given.

Seminário financiado por Fundos Nacionais através da FCT – Fundação para a Ciência e a Tecnologia no âmbito do projeto UID/MAT/04561/2013