# SEMINÁRIO DE ANÁLISE E EQUAÇÕES DIFERENCIAIS

## Dia 6 de Novembro (terça-feira), às 13h30, na sala 6.2.33

# Multiple solutions for the 2-dimensional Euler equations

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Abstract:

In one space dimension, it is well known that hyperbolic conservation laws have unique entropy-admissible solutions, depending continuously on the initial data. Moreover, these solutions can be obtained as limits of vanishing viscosity approximations.

For many years it was expected that similar results could be proved also in several space dimensions. However, fundamental work by De Lellis, Szekelyhidi, and collaborators, has shown that multidimensional hyperbolic Cauchy problems usually have infinitely many weak solutions. Moreover, the usual entropy criteria fail to select a single admissible one.

In the first part of this talk I shall outline this approach based on a Baire category argument, yielding the existence of infinitely many weak solutions.

I then wish to discuss an alternative research program, aimed at constructing multiple solutions to some specific Cauchy problems. Starting with some numerical simulations, here the eventual goal is to achieve rigorous, computer-aided proofs of the existence of two distinct self-similar solutions with the same initial data. While solutions obtained via Baire category have turbulent nature, these self-similar solutions are smooth, with the exception of one or two points of singularity. They are thus much easier to visualize and understand.

Local: FCUL, C6 - Piso 2, 6.2.33

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