SEMINÁRIO DE EQUAÇÕES DIFERENCIAIS

Blowup in incompressible flows: renormalization and dynamical system approach

Alexei A. Mailybaev

Instituto de Matemática Pura e Aplicada (IMPA)

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Resumo: The existence of a blowup (finite-time singularity) in incompressible Euler and Navier-Stokes equations is one of the central contemporary problems in the area of PDEs. We analyze the blowup in the inviscid shell model of turbulence, which is considered as a "toy" model for understanding the structure of a possible blowup phenomenon. We prove that the blowup exists and its internal structure is determined by an attractor of the dynamical system induced by the renormalization procedure. Blowup structures (periodic, quasi-periodic and chaotic) are classified and observed in numerical simulations.