

# The Navier-Stokes regularity problem

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**Abstract:** Incompressible Navier-Stokes equations is the fundamental system of partial differential equations that models the motion of incompressible Newtonian fluids, e.g., water. For any smooth localized initial velocity field in  $\mathbb{R}^3$ , there is a weak solution that exists for all time and is regular for short time. However its regularity for all time is a significant open problem. This is related to the question whether the Navier-Stokes system describes turbulence. In this talk I will try to explain the difficulty of this problem and partial results so far, to a general audience including beginning graduate students who know the heat equation.

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