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Contour dynamics and singularities in incompressible flows.

The search of singularities in incompressible flows has become a major challenge in the area of non-linear partial differential equations and is relevant in applied mathematics, physics and engineering. The existence of such singularities would have important consequences for the understanding of turbulence. One way to make progress in this direction, is to study plausible scenarios for the singularities supported by experiments or numerical analysis.

With the more sophisticated numerical tools now available, the subject has recently gained considerable momentum. The main goal of this project is to study analytically several incompressible fluid models. In particular solutions involving the possible formation of singularities or quasi-singular structures.