Patterns and equilibria in incompressible fluids

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Resumen. The motion of a uniform incompressible fluid is described by the Navier-Stokes equations and, in its inviscid regime, via the Euler equations. In the two-dimensional case, the Euler equations in the vorticity formulation contain many interesting relative equilibria: stationary, rotating and translation solutions. Bifurcation theory arises naturally in the study of many PDE's, which can be characterized by an implicit equation of the form

$$F(\lambda, x) = 0, \tag{1}$$

where $\lambda \in \mathbb{R}$ and x belongs to some infinite-dimensional Banach space. In this talk, we will take advantage of this theory to review the existence of different kind of solutions: V-states, non uniform rotating vortices or Karman Vortex Street type of solutions, among others. All those simplified dynamics are governed by a nonlinear and nonlocal equation of type (1).

Palabras clave: Euler equations, incompressible fluids, bifurcation theory

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