

Temam, R.

Attractors for Navier-Stokes equations. (English) Zbl 0572.35083

Nonlinear partial differential equations and their applications, Coll. de France Semin., Vol. VII, Paris 1983-84, Res. Notes Math. 122, 272-292 (1985).

[For the entire collection see 559.00005.]

There is an acute shortage of good expository articles summarizing latest results in almost any field of mathematics. This is exactly such an article. The author summarizes some of the recent results that concern the attractors for the Navier-Stokes equations in space of dimension 2 and 3. In the two dimensional case, the existence of a maximal attractor is shown and a bound of its fractal dimension is described, this bound being perhaps optimal. In dimension three, under the assumption that the flow remains smooth in the sense of Leray, it is shown that the dimension of the attractor is that predicted by the Kolmogorov theory of turbulence.

In particular, the author reviews the Babin-Vishik bound on the Hausdorff dimension of the universal attractor and relates it to the Kolmogorov-Landau-Lifschitz estimate on the number of degrees of freedom of a turbulent flow, that is identified with the fractal dimension of a corresponding attractor.

Reviewer: [V.Komkov](#)

MSC:

[35Q30](#) Navier-Stokes equations

[37C70](#) Attractors and repellers of smooth dynamical systems and their topological structure

Cited in 1 Review
Cited in 246 Documents

Keywords:

[attractors](#); [Navier-Stokes equations](#); [fractal dimension](#); [turbulence](#)