

Exact solutions and fully-developed turbulence

Discussion session

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Exact solutions and fully-developed turbulence

- Will exact solutions help us understand fully-developed flows?
 - How do exact solutions scale with Re , pipe length, aspect ratio, etc.?
 - Does turbulence visit these solutions, and how does that scale with Re ?
 - How do spatially periodic solutions relate to behavior in larger domains?
 - Suggestion to compute solutions of more turbulent flows via LES
- Q&A on existing work
 - Computational methods
 - “Low dimensionality”: finite sets of exact solutions \neq low-d projection
 - Is there a bound for the number of equilibria?
 - How many periodic orbits are there for a given flow?
Infinite, but hierarchical: the short, weakly unstable orbits dominate
- Periodic orbit theory
 - Relates statistics of dynamical systems to properties of periodic orbits
 - Where has periodic orbit theory been successfully applied?
 - What about other kinds of solutions (invariant tori)?