Abstract Submitted
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An adjoint-based method for identifying invariant solutions and dynamical connections in weakly turbulent flows.[1] RAVI KUMAR PALLANTLA, BALACHANDRA SURI, LOGAN KAGEORGE, MICHAEL SCHATZ, ROMAN GRIGORIEV, Center for Nonlinear Science and School of Physics, Georgia Institute of Technology — In the past decade, numerical and experimental investigations in a variety of fluid flows have demonstrated that chaos/turbulence is guided by unstable, non-chaotic solutions. However, numerically computing these solutions using the traditional Newton-based methods is expensive and, for sufficiently large problems, may become intractable even with matrix-free methods. In this talk, we present an adjoint-based approach that overcomes some of these difficulties. We demonstrate the method by applying it to find equilibria, periodic orbits, and heteroclinic connections in an experimentally accessible Kolmogorov-like 2D flow with physical no-slip boundary conditions.

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