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Equilibria, traveling waves, and periodic orbits of plane Couette flow JOHN GIBSON, JONATHAN HALCROW, PREDRAG CVITANOVIC, School of Physics, Georgia Institute of Technology — Equilibrium, traveling wave, and periodic orbit solutions of pipe and plane Couette flow can now be computed precisely at Reynolds numbers above the onset of turbulence. These invariant solutions capture the complex dynamics of rolls and streaks and provide a framework for understanding turbulent wall-bounded shear flows as dynamical systems. We present a number of newly computed equilibria, traveling waves, and periodic orbits of plane Couette flow, classify their symmetry groups, and observe how frequently they are visited by turbulent dynamics. What emerges is a picture of low-Reynolds turbulence as a walk among a set of weakly unstable invariant solutions.

John Gibson
School of Physics, Georgia Institute of Technology

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