Abstract Submitted
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Low-order invariant solutions in plane Couette flow[1] MUHAMMAD AHMED, ATI SHARMA, Univ of Southampton — Ten new equilibrium solutions of the Navier-Stokes equations in plane Couette flow are presented. The new solutions add to the inventory of known equilibria in plane Couette flow found by Nagata JFM 1990, Gibson JFM 2008, 2009, and Halcrow JFM 2008, who together found 13. These new solutions elucidate the low-dimensional nature of exact coherent structures, which are essential to defining simplified mechanisms that explain the self-sustaining nature of wall-bounded flows. In particular, one of the solutions found has a one-dimensional unstable manifold in the symmetry-invariant subspace and otherwise, like the lower branch equilibrium solution found by Nagata JFM 1990. A new method for generating initial guesses for Newton-Krylov-hookstep (NKH) searches is also presented. This method allows the NKH algorithm to find equilibrium solutions that are derived from previous solutions.

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