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Mirror-symmetric exact coherent states in plane Poiseuille flow. (English) Zbl 1294.76115
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Summary: Two new families of exact coherent states are found in plane Poiseuille flow. They are obtained from the stationary and the travelling-wave mirror-symmetric solutions in plane Couette flow by a homotopy continuation. They are characterized by the mirror symmetry inherited from those continued solutions in plane Couette flow. The first family arises from a saddle-node bifurcation and the second family bifurcates by breaking the top-bottom symmetry of the first family. We find that both families exist below the minimum saddle-node-point Reynolds number known to date [*F. Waleffe*, *Phys. Fluids* 15, No. 6, Paper No. 1517, 18 p. (2003; [Zbl 1186.76556](#))].

MSC:

[76E05](#) Parallel shear flows in hydrodynamic stability
[76E30](#) Nonlinear effects in hydrodynamic stability
[76F06](#) Transition to turbulence

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Keywords:

bifurcation; nonlinear instability; transition to turbulence

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