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Homoclinic Orbits to Streamwise-Localized Solution in Pipe Flow[1] JULIUS RHOAN LUSTRO, GENTA KAWAHARA, MASAKI SHIMIZU, Graduate School of Engineering Science, Osaka University — We do numerical study on transition to turbulence in pipe flow by investigating a streamwise-localized solution. We explore the trajectory along the unstable manifold of the lower branch of this time-periodic solution and found the presence of homoclinic orbits related to it. These homoclinic orbits are extracted by performing a bisection method. The presence of homoclinic orbits implies the existence of a Smale horseshoe which generates chaos and can be evidence to support a theoretical description of the onset of spatially localized transient turbulence – i.e., turbulent puff – observed in pipe flow experiments.

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