

Global regular axially-symmetric solutions
to the Navier-Stokes equations with small swirl

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Abstract

We consider axially-symmetric Navier-Stokes equations in a bounded cylinder with the following boundary conditions: angular component of velocity, angular component of vorticity and the stream function vanish on the boundary. Using some appropriate estimate in weighted spaces for the stream function we derive a nonlinear inequality for vorticity. The inequality implies an estimate for vorticity for a sufficiently small swirl. The estimate is sufficient to show regularity of weak axi-symmetric solutions to the Navier-Stokes equations. This is the joint work with Bernard Nowakowski.