

Asymptotics of small exterior Navier-Stokes flows with non-decaying boundary data

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We prove the existence of unique solutions for the 3D incompressible Navier-Stokes equations in an exterior domain with small boundary data which do not necessarily decay in time. As a corollary, the existence of unique small time-periodic solutions is shown. We next show that the spatial asymptotics of the periodic solution is given by the same Landau solution at all times. Lastly we show that if the boundary datum is time-periodic and the initial datum is asymptotically self-similar, then the solution converges to the sum of a time-periodic vector field and a forward self-similar vector field as time goes to infinity.

This is joint work with Kyungkuen Kang and Tai-Peng Tsai.