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# Asymptotic stability of the stationary Navier-Stokes flows in Besov spaces

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We discuss asymptotic stability of stationary solution to the incompressible Navier-Stokes equations in Besov spaces on the whole space. For small external forcel, we construct the stationary solution belonging to $\dot{B}^{s(p)}_{p,\infty}$, $(s(p) := -1 + n/p)$, which is a scale invariant space. Then, we show that if the initial data is sufficiently close to the stationary solution then the corresponding non-stationary solution tends to the stationary one when time tends to infinity in the Besov spaces $\dot{B}^{s(p)+\tau}_{p,\infty}$ with some $\tau > 0$. In the case that the low frequency of $f$ behave better, we also obtain the stability in $\dot{B}^{s(p)-\tau}_{p,\infty}$ with some $\tau > 0$. A critical estimate for the semigroup generated by the Laplacian with a perturbation plays an important role in the proof. This is based on resolvent estimates for the Laplacian. To do that, we borrow an argument from Kozono-Yamazaki ('95).

This talk is based on a joint work with Jayson Cunanan (Saitama Univ.) and Takahiro Okabe (Hirosaki Univ.).