

Pointwise decay estimate of Navier-Stokes flows in the half space with slowly decaying initial value

Tongkeun Chang and Bum Ja Jin
Yonsei University, South Korea,
email: chang7357@yonsei.ac.kr
Mokpo National University, South Korea,
email:bumjajin@hanmail.net

Abstract

In this paper we study the spatial and temporal decay estimate of the Navier-Stokes flow corresponding to an uniformly but slowly decaying initial velocity. We show the local solvability of the Navier-Stokes equations with

$$|u(x, t)| \leq C_0(1 + |x| + \sqrt{t})^{-\min(\alpha, n)}$$

when $(1 + |x|)^\alpha e^{-tA}h \in L^\infty(\mathbb{R}_+^n \times (0, \infty))$ for initial data h . We also show that the solution exists globally in time for $1 \leq \alpha$ when $\|(1 + |x|)^\alpha e^{-tA}h\|_{L^\infty(\mathbb{R}_+^n \times (0, \infty))}$ is small enough.

Keywords: navier–Stokes equations, decay estimate, slow decay.