



ON ANISOTROPIC DECAY RATE ESTIMATES FOR THE NAVIER-STOKES EQUATIONS

*Dedicated to Professor Yoshikazu Giga of Tokyo University
on the occasion of his retirement*

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Abstract. We consider the nonstationary incompressible Navier-Stokes equations with nonzero external forces and zero initial data in \mathbf{R}^n ($n \geq 3$). Spatial decay rates of the solutions in the so called Serrin's class are shown, while decay rates of data are anisotropically prescribed. To consider anisotropic measurable functions, we recall the Lebesgue space equipped with the mixed norm. A weighted equation approach is applied here, that is, by multiplying anisotropically growing function to the equation, we estimate the weighted solution by the weighted and non-weighted data in the space with the mixed norm. In case the temporal decay rates of the external forces are almost zero, we obtain the spatial decay rate estimates such that the decay rates of the solutions are almost same as those of the external forces in the $n - 2$ dimensional spatial directions and are greater than 2 plus those of the external forces in the remaining 2 dimensional spatial directions.

Communicated by Yoshikazu Giga; Received March 16, 2021

AMS Subject Classification: 76D05, 35Q30.

Keywords: mixed norm, regularity class, uniform bound of weighted solutions, The Gagliardo-Nirenberg-Yamazaki inequality.