Research Report（September, 2021- September, 2022）

Enrollment from September 2020 | Department of Pure and Applied Mathematics | Fumitaka WAKABAYASHI

I. List of Papers

Kozono, H., Ushikoshi, E., Wakabayashi, F., Removable time-dependent singularities of solutions to the Stokes equations, Journal of Differential Equations, published online January 2023, Volume 342, Pages 472-489.

II. List of Talks

Removability of time-dependent singularities in the Navier-Stokes equations, 若手による流体力学の基礎方程式研究集会プログラム（オンライン), January 2022.

III. Research Results in AY2020

I summarized the result on the existence of the solution with time-dependent singularities to the Navier-Stokes equations and the removability of time-dependent singularities of the Navier-Stokes equations to my doctoral thesis. I also studied the construction of the singular solutions with higher dimensional time-dependent singular sets and the removability of time-dependent singular sets in the Navier-Stokes equations.

IV. Research Plan for AY2021

I tried to achieve two goals last year, but I am going to focus on the study in the construction of the singular solutions with time-dependent singular sets and the removability of time-dependent singular sets in the Navier-Stokes equations. As opposed to the heat equation, it is difficult to obtain the asymptotic behavior of the solutions near the time-dependent singular sets by Duhamel's principle in the Navier-Stokes equations. Moreover, I cannot show the existence of the solutions by means of sub- and supersolutions. Therefore, I consider other methods are necessary.