

Mathematics and Physics Unit “Multiscale Analysis, Modelling and Simulation”, Top Global University Project, Waseda University
Report on Study Abroad
Name : Jou-chun Kuo

1. Destination:

Institute of Mathematics, Czech Academy of Sciences (Prague, Czech Republic)

2. Dates of stay:

April 30, 2023~July 1, 2023

3. Purpose:

To attend the lectures given by Prof. Yoshihiro Shibata and study the Navier-Stokes equations and related topics.

4. Education and research activity in the destination:

In this stay, I attended two special lectures: “Maximal regularity and free boundary problem for the Navier-Stokes equations” and “R-solver approach to the maximal regularity of the free boundary problem for the Navier-Stokes equations” both of which were given by Prof. Yoshihiro Shibata. In these lectures, I was able to learn the maximal regularity approach to the Stokes equation and the applications to the free boundary problem. I also attended the “Biomedical Fluid Mechanics” workshop, ODE’s seminar and the lecture given by the postal researcher, Dr. Danica Basaric. The workshop is about mathematical modeling and various biomedical topics such as respiratory system, bloody problems.

During my stay at Czech Academy of Sciences, I completed the estimates of maximal L_1 regularity for the compressible Stokes equations under the guidance of Prof. Yoshihiro Shibata. We consider the generalized resolvent problem associated with the linearized system in the whole space and in the half space. We used the real interpolation in order to overcome the difficulty when showing the case $p=1$ since we cannot rely on the Fourier multiplier theorem due to Weis that we usually apply to derive the maximal regularity theorem for case $1 < p < \infty$.

5. Other comments:

First and foremost, I would like to express my sincere gratitude to Prof. Nečasová Šárka for accepting my visit. I would also like to thank all the members I met at Czech Academy of Sciences for their support during my stay in Prague, as well as the postdoctoral researchers who always encouraged me and shared their research experiences. Finally, I would like to extend my deepest

gratitude to Prof. Yoshihiro Shibata and Top Global University Project at Waseda University for giving me such a great opportunity to visit Czech Academy of Sciences. Moreover, I am also thankful to Ms. Yukari Ishizaki for making travel arrangements for me.



Institute of Mathematics, Czech Academy of Sciences



Prof. Yoshihiro Shibata's lecture



Lunch with Professors



The members of the Czech Academy of Sciences