

様式 2 帰国報告書 (ITP Research Report)

Research Report of JSPS-ITP

(The international sending-elevating project for young mathematicians based on singularity, topology and mathematical analysis: Hokudai model)

Name: Shin Hattori

Name of ITP Partner Institute: Durham university

Period of ITP-Stay: from Jun. 30, 2008 to Sep. 29, 2008

Research Report: I had visited Durham University in UK for three months. Originally, I arranged the period of my stay to be six months. However, I got a post in Kyushu University and thus I had to go back to Japan ahead of schedule. My recent research interest is the ramification of geometric torsion Galois representations. The information of ramification of such Galois representations has many geometric meanings which often lead us to global applications, such as a proof of Shafarevich conjecture that states non-existence of Abelian varieties with everywhere good reduction over small algebraic number fields. I had weekly seminars with Professor Abrashkin in Durham University on this topic. First we discussed about a ramification bound for semi-stable torsion Galois representations, which I had obtained just before the stay. We tried to prove a generalization of Shafarevich conjecture using this ramification bound and got some idea to overcome a first difficulty in proving this. Thanks to the examples we calculate in the process, I can improve my ramification bound for some case. We also discussed about how to obtain a similar ramification bound for crystalline torsion Galois representations. As for this topic, we can find an interesting example which indicates that when the torsion Galois representation is crystalline, then we may be able to descent down an algebra over an extension of the base field to an algebra over itself. It is very happy for me that through these discussions, we could share many stimulating ideas and experiences. I am going to continue studying these topics ahead. At the end of September, just before my departure to Japan, I had a talk on my previous work at Durham university. After the talk, I also had a very vigorous discussion. Though I had to shorten the period of my stay, it was very nice opportunity to go abroad, concentrate on mathematics, and have many discussions with Professor Abrashkin. I learned from him a lot, not only from his mathematical ideas and our discussions, but from his attitude toward mathematics. I would like to express my gratitude to him, and the ITP program which gave me such an exciting opportunity to studying mathematics in Durham University.