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Report on my visit to South Africa, January 17 − 28, 2018

The initiative of this visit was a message sent by Fabien Pazuki in April 2017, saying: *Le CNRS mandate Yuri Bilu et moi-même pour œuvrer à l'élargissement des échanges mathématiques entre l'Afrique du Sud et la France au niveau recherche. À ce stade, nous vous écrivons pour savoir si vous avez des collaborateurs liés aux universités sud-africaines (ainsi que Madagascar) ou des projets de collaborations avec cette région du monde . . . Pour information, les Départements de Mathématiques de l'Université de Bordeaux et de l'Université de Copenhague seront partenaires des actions entreprises.* At that time, I had applied for teaching a 3 weeks course in AIMS Cape Town. My initial program could not take place, since the availabilities of AIMS and myself were not compatible, but this CNRS–IRD program IRN GandA gave me the opportunity to pay a shorter visit to South Africa.

I reached Johannesburg on January 18. I could participate to the end of the CIMPA Research School *Explicit Number Theory* (08/01/2018 to 19/01/2018) at the University of Witwatersrand, Johannesburg. The administrative and scientific coordinators were Florian Luca (University of the Witwatersrand, South Africa) and Yuri Bilu (University of Bordeaux, France) ; the Scientific committee was composed of Yuri Bilu, Florian Luca, Amalia Pizarro (Universidad de Valparaiso, Chile), Shabnam Akhtari (University of Oregon, USA) and Valerio Talamanca (University of Roma Tre, France). The representative of CIMPA was Vlady Ravelomanana (Université Paris 7). After my visit to Johannesburg, I had further communication with him for the development of mathematics in Madagascar, and especially for increasing joint activities with French mathematicians (which is precisely one of the aims of the CNRS–IRD program IRN GandA which sponsored my visit).

On January 19, on the last day of the CIMPA School, I gave a talk on *Representation of positive integers by binary cyclotomic forms*. Another talk was given
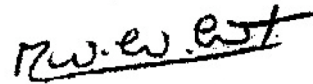
by Kitagawa Tomoko (Oxford University, United Kingdom): *A Global History of Mathematics.*

From January 21 to 27, 2018, I visited Cape Town.

On 22 January 2018 I participated to the Stellenbosch Number Theory Day, organized by Florian Breuer. I gave the first lecture of this meeting on *Representation of positive integers by binary cyclotomic forms.* The next lecture was given by Peter Stevenhagen (Leiden): *Primitivity of points on elliptic curves.* Two lectures were given in the afternoon: by Cynthia Ramiharimanana (AIMS-SA): *On the minimal ramification problem* and by Harry Schmidt (Manchester): *Counting rational points and lower bounds for Galois orbits.* A few weeks earlier, I received from ZbMath (Zentralblatt) the paper *Algebraic values of certain analytic functions* by Gareth J. Boxall and Gareth O. Jones for review; so I could discuss this topic with Harry Schmidt and Gareth J. Boxall.

I stayed in AIMS for the rest of my visit to South Africa. During my visit to AIMS, at the initiative of Jeff Sanders (director of studies at AIMS), I gave two short presentations for the students at the begining of their courses on Fluid dynamics (teachers: Grae Worster and Richard Katz) and discrete mathematics (teacher: Dr Nancy Ann Neudauer). During my stay in AIMS there was a *Workshop on Women in Discrete Mathematics and its Applications* organized by Nancy Ann Neudauer. It was my third visit to an AIMS Center, I visited very shortly AIMS Ghana (Biriwa, Cape Coast) in July 2014 and I gave a 3 weeks course in AIMS Senegal (M'Bour) in March - April 2016. I will give a further course in February - March 2018 at AIMS Ghana. It was an interesting experience for me to see how AIMS Cape Town is working, with dedicated scientists giving 3 weeks courses to a number of interested students from several countries in Africa. The organization of AIMS is superb, but the problems of security in the country and the lack of water in Cape Town are worrying.

I am thankful to the CNRS–IRD program IRN GandA for its support, to Fabien Pazuki and Yuri Bilu who run it, to Cathy Métivier for the administrative help, to Florian Luca for my stay in Johannesburg and to Florian Breuer and Barry Green for my stay in Cape Town.

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Links

- IRN (International Research Network) GandA (Geometry and Arithmetic) http://www.southern-africa.cnrs.ird.fr/

- CIMPA Research School *Explicit Number Theory*
  https://www.cimpa.info/en/node/5831

- Local website of the school http://www.rnta.eu/SA2018/

- The University of Witwatersrand, Johannesburg
  https://www.wits.ac.za/

- Stellenbosch University, Cape Town https://www.sun.ac.za/

- Faculty of Science http://www.sun.ac.za/english/faculty/science/

- Department of Mathematical Sciences (Mathematics, Applied Mathematics, Computer Science) Mathematics Research Groups Algebra and Number Theory
  https://www.sun.ac.za/english/faculty/science/Mathematics/research/research-groups

- Algebraic Number Theory & Arithmetic Algebraic Geometry
  https://www.sun.ac.za/english/faculty/science/Mathematics/research/research-groups/algebraic-number-theory-arithmetic-algebraic-geometry

- AIMS African Institute of Mathematical Sciences
  https://www.aims.ac.za/

- Workshop on Women in Discrete Mathematics and its Applications.
  https://sites.google.com/aims.ac.za/women-in-discrete-mathematics

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