CRM-ISM-AMQ Prize awarded to Francesco Amoroso and Sinnou David

It is our pleasure to announce that the first CRM-ISM-AMQ prize for an outstanding publication in the *Annales Mathématiques du Québec* (AMQ) shall be awared to Francesco Amoroso and Sinnou David for their paper "Covolumes, unités, régulateur: conjectures de D. Bertrand et F. Rodriguez-Villegas".

This paper brings important progress towards conjectures of Bertrand and Rodriguez-Villegas which aim at unifying Lehmer's conjecture with Zimmer's lower bound for the regulator of a number field K. Recall that the regulator of K measures the size of the group of units of K, and is a crucial ingredient of the celebrated class number formula. It is generally quite large and Zimmer showed that it grows at least exponentially in the degree of K. Essentially, the regulator of K is the co-volume of the lattice in Euclidean space obtained as the image of the group of units of K under the logarithmic embedding. Similarly, one can compute the co-volume for any subgroup E of that group. Based on conjectures of Bertrand and Rodriguez-Villegas, the authors conjecture a lower bound for this co-volume which depends only on the rank of E. For the full group, it follows from the result of Zimmer. For a subgroup E of rank one, it is reminiscent of a famous conjecture of Lehmer.

The authors prove this conjecture in three situations: when the rank of the subgroup E is at least three but small compared to the degree d of the field K, or when the field K is totally real or totally p-adic, or finally when the subgroup E contains the group of relative units of K over a subfield k of degree at most $d/(400\log(d))$. This improves on a recent result of Chinburg, Friedman and Sundstrom which requested that the degree of k is at most a constant times $\log(d)$. This major improvement is based on clever geometric considerations together with a lower bound for the ratio of the regulators of K and k due to Friedman and Skoruppa.

This nicely written paper is the latest of a series of nine fundamental joint papers of Amoroso and David dealing with the generalized Lehmer problem and the effective Bogomolov problem for algebraic tori.

Francesco Amoroso: After completing his Ph.D. at the University of Pisa in 1986 and a Perfezionamento at the Scuola Normale Superiore of Pisa (1987-89), he was a lecturer at the University of Padua (1991-92), a member of the Institute for Advanced Study at Princeton (1992-93), an associate professor at the University of Pisa (1992-96), and a professor ordinario at the University of Turin (1996-99). Since 1999, he has been a professor at the University of Caen, where he directed the mathematics laboratory from 2013 to 2018.

Sinnou David: After completing his Ph.D. at the Pierre et Marie Curie University (Paris VI) in 1989 and a short post-doctoral fellowship at the University of Orsay, he joined the University of Paris VI as a lecturer. He obtained his habilitation to direct research in 1995, and has been a professor there since 2006. He was deputy director of the Institut mathématiques de Jussieu-Paris Rive-Gauche (2008-2012), deputy scientific director of the Institut national des sciences mathématiques et de leurs interactions (2012-2017), and has been very active in the mathematical cooperation between France and India. He has been a visiting professor in many institutions in Europe, America and Asia.