Introductory Workshop on Euler Systems and Special Values of L-functions
21/08/2017 - 25/08/2017

EPFL, CIB
August 8, 2017
**Antonio Lei**  
Université Laval  
*Cyclotomic units and elliptic units*  
In this series of three talks, I will define cyclotomic units and elliptic units, prove certain basic arithmetic properties of these units and explain how they provide concrete examples of Euler systems. In particular, I will show that these units satisfy certain norm compatibility relations and that they are related to special values of some L-functions.

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**Ellen Eischen**  
University of Oregon  
*p-adic L-functions*  
This mini-course consists of introductory lectures on p-adic L-functions, at a level suitable for graduate students getting started.  
A p-adic L-function is a p-adic analytic function whose values at certain points agree with the values of a (suitably modified) complex-valued L-function. I will focus primarily on the simplest examples (namely, L-functions attached to certain characters, modular forms, and elliptic curves), especially ones related to the other mini-courses. I will introduce p-adic measures, relate measures to Iwasawa algebras, and explain how to construct certain p-adic L-functions in terms of p-adic measures (or equivalently, realize them as elements of Iwasawa algebras). To help participants prepare for the research conference the following week, I will emphasize ingredients shared by many constructions.

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**Jan Nekovar**  
Université Pierre et Marie Curie  
*Euler systems and Kolyvagin systems.*  
In this minicourse we are going to explain the basic principles and the main results of the general formalism of Euler systems and Kolyvagin systems.

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**Ming-Lun Hsieh**  
Academia Sinica  
*The approach of congruences among modular forms to Iwasawa main conjectures.*  
The aim of this mini-course is to explain the general approach of Eisenstein congruences to Iwasawa main conjectures by walking through Wiles’ proof of Iwasawa main conjecture over Q.
If time permits, we will also talk about the CM congruences studied by Hida and Tilouine.

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**Francesc Castella**  
Princeton University

*The Heegner point Kolyvagin system.*

The theory of Euler systems and Kolyvagin systems was largely motivated by Kolyvagin’s work on systems of Heegner points, yet these classes do not quite fit into the general axiomatic treatment developed by Rubin and Mazur-Rubin. In this mini-course, we will explain the adjustments that need to be made to the general theory in order to accommodate the systems of classes coming from Heegner points, discuss the non-triviality of these systems in various settings, and (time-premitting) mention some applications.