

The 21st Takagi Lectures

June 23 (Sat), 2018

Lecture Hall (Room No. 420)

Research Institute for Mathematical Sciences

Kyoto University, Kyoto, Japan

ABSTRACT

Nicolas Bergeron:

Euler classes transgressions and Eisenstein cohomology of $GL_N(\mathbf{Z})$

These notes were written to be distributed to the audience of the first author Takagi lectures to be delivered June, 23 2018. These are based on a work-in-progress of the four authors.

In this work-in-progress we give a new construction of some Eisenstein classes for $GL_N(\mathbf{Z})$ that were first considered by Nori [38] and Sczech [42]. The starting point of this construction is a theorem of Sullivan on the vanishing of the Euler class of $SL_N(\mathbf{Z})$ vector bundles and the explicit transgression of this Euler class by Bismut and Cheeger. Their proof indeed produces a universal form that can be thought of as a kernel for a *regularized theta lift* for the reductive dual pair (GL_1, GL_N) . This suggests looking to reductive dual pairs (GL_k, GL_N) with $k \geq 1$ for possible generalizations of the Eisenstein cocycle. This leads to interesting arithmetic lifts.

In these notes we don't deal with the most general cases and put a lot of emphasis on various examples that are often classical. Our primary hope is to show that our construction sheds some light on classical and new rationality questions in arithmetic.

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Jean-François Le Gall:

Brownian Geometry

We present different continuous models of random geometry that have been introduced and studied in the recent years. In particular, we consider the Brownian map, which is the universal scaling limit of large planar maps in the Gromov–Hausdorff sense, and the Brownian disk, which appears as the scaling limit of planar maps with a boundary. We discuss the connections between these models, and we emphasize the role played by Brownian motion indexed by the Brownian tree.

Organizing Committee

Y. Kawahigashi, T. Kobayashi, T. Kumagai, H. Nakajima, K. Ono, T. Saito