Report on the Landau Center Workshop :
"Regulators in Analysis, Geometry and Number Theory"

Organizers: Alexander Reznikov, Norbert Schappacher

A workshop on: *Regulators in Analysis, Geometry and Number Theory* was organized at the *Edmund Landau Center for Research in Mathematical Analysis* at the Hebrew University from Monday, 11 March 1996 (day of arrival) until Wednesday, 20 March 1996 (day of departure). The goal of the workshop had been to assess the current state of the theory of secondary invariants and regulators, in view of recent progress towards bringing together the analytic, topological, differential-geometric and algebraic approaches.

List of participants.

Prof. V. Batyrev, Essen
Prof. J.-M. Bismut, Paris
Prof. S. Bloch, Chicago
Prof. J. Cuntz, Heidelberg
Prof. E. de Shalit, Jerusalem
Prof. H. Esnault, Essen
Prof. A. Goncharov, Bonn
Prof. M. Hanamura, Bonn
Dr. K. Köhler, Bonn
Prof. K. Künnemann, Münster
Prof. A. Levin, Bonn
Prof. A. Lubotzky, Jerusalem
Dr. V. Maillot, Paris
Dr. A. Reznikov, Jerusalem
Prof. I. Rips, Jerusalem
Prof. N. Schappacher, Strasbourg
Prof. P. Schneider, Münster
Prof. C. Soulé, Paris
Prof. E. Viehweg, Essen
Dr. J. Wildeshaus, Münster
Prof. D. Zagier, Bonn

Three major themes stand out in the **scientific programme** of the workshop.

(1) Recent progress and future perspectives of the theory of polylogarithms
(2) b_1-positivity of hyperbolic manifolds
(3) Analytic torsion

Topic (1) was discussed in the talks by Goncharov, Levin, Schappacher and Wildeshaus — see the schedule of talks attached to this report. Although classcial polylogarithms, and Zagier's conjectures concerning special values of Dedekind zeta functions related to them, featured in some of these lectures, more attention was given to the recent elliptic analogue of them, as well as to Wildeshaus's generalization to mixed Shimura varieties.

Topic (2) centered around ongoing research of A. Reznikov concerning strategies towards conjectures of Thurston's. The talks devoted this circle of ideas were those by Lubotzky, Reznikov, Rips, and Rogawski.

Topic (3) was represented by Bismut, Köhler, and Künnemann.

Since the workshop brought together specialists representing different topics of what is beginning to form a subject in its own right, speakers were encouraged to give surveys of some of the theories involved. Thus Schneider lectured on the Bloch-Kato conjectures, and Bloch will contribute a larger survey article about the last 10 years of the Beilinson conjectures to the proceedings volume. Other survey like lectures were those by Batyrev, Cuntz, Viehweg, and Zagier.

Organization.

Thanks are due to the *Max-Planck-Institut für Mathematik* for co-financing a few of the participants.

The workshop took place right after a series of terrorist bombings in Jerusalem. Contrary to our initial fears, this did not only not produce any cancellation of speakers, but prompted two colleagues to participate who originally had not planned to come,

A hike around the Crusader Castle Montfort was organized on MArch 16. The conference dinner was held on March 17.

Refereed proceedings of the workshop are in preparation to be published in the *Progress in Mathematics* series of Birkhauser Verlag.