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Elliptic Curves and Modular Forms in Algebraic Topology

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Preface

This volume contains the proceedings of a conference held September 15-17, 1986 at the Institute for Advanced Study in Princeton, New Jersey.

The introductory article provides an account of the recent history of the field of elliptic genera and elliptic cohomology, the central theme of the conference.

The main surprise at the conference was that its original conception was too narrow, and that geometry and physics also enter prominently into this area. For this, see the paper by Ed Witten.

I am grateful to Noriko Yui for permitting her paper on the formal groups of Jacobi quartics, an especially relevant topic for the study of elliptic genera, to be included in this volume.

Thanks are due to David and Gregory Chudnovsky for the suggestion to hold such a conference, and to Bob Stong for substantial advice throughout. It is also a pleasure to thank the School of Mathematics at the Institute for Advanced study, for providing the setting for the conference, and especially Linda Sheldon for much aid. Partial financial support was provided by the National Science Foundation.

Conference Talks

S. Ochanine, Elliptic genera for S^1 manifolds

P. Landweber, Periodic cohomology theories defined by elliptic curves

D. Chudnovsky and G. Chudnovsky, Elliptic formal groups over $\mathbb{Z}$ and $\mathbb{F}_p$ in applications to topology, number theory and computer science

R. Stong, Dirichlet series and homology theories

D. Ravenel, BP-theory for number theorists

M. Hopkins, Characters and generalized cohomology

J. Morava, The Weil group as automorphisms of the extraordinary K-theories

D. Zagier, Modular forms, elliptic functions, Jacobi forms

E. Witten, Elliptic genera and quantum field theory

J. Lepowsky, Infinite dimentional algebras and modular functions

J. Stasheff, Homotopical Lie representations in theoretical physics

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