

## Preface

This volume contains an account of the topics dealt with at the research conference “Zeta Functions in Geometry” held at Tokyo Institute of Technology, Tokyo, Japan from August 14 through August 18, 1990.

The concept of zeta functions, whose origin is in the celebrated study of prime numbers by Euler and Riemann, has been one of the richest sources in modern number theory and algebraic geometry. It turned out recently that various analogues of zeta functions could be introduced in many other areas including dynamical systems, combinatorics and differential geometry. This striking trend may imply that the concept of zeta functions is “universal” in mathematical sciences.

Our attempt of the research conference was to make an opportunity for discussions and presentations of the most recent results by geometers and number theorists on zeta functions in several different categories, thereby enhancing contacts between them. They have objects of study in common, have developed strong interactions, but differ in their point of view. It was accomplished, by this exchange of ideas, to give a new insight to the zeta functions in the various branches as well as the classical zeta functions.

In geometry, zeta functions come up with counting problems of some geometric objects. For instance, the Ruelle-Smale zeta function (a generalization of the Selberg zeta function) and the Ihara zeta function are introduced in connection with counting periodic orbits in a dynamical system and counting cycles in a graph. In spectral geometry, we encounter the zeta functions associated with eigenvalues of some geometric elliptic operators. Zeta functions associated with prehomogeneous vector spaces are important objects in algebraic analysis initiated by M. Sato. In the conference, such zeta functions were extensively discussed.

The organizing committee is indebted both to the Inamori Foundation whose financial support made the conference possible, and to Professor K. Shiohama who gave us a strong moral support in the planning stages.

The responsibility for the final preparation of the manuscript was placed in the most capable hand of Mrs. Kazuko Kozaki in the Department of Mathematics, Nagoya University. We also owe much to Dr. Chiaki Tsukamoto who wrote the style files for printing this volume. To all of the above we express our hearty thanks.

T. SUNADA, editor