Mathematical Contributions of Professor Akio Hattori

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Professor Akio Hattori was born in Tokyo in 1929 as the first son of a famous biologist Shizuo Hattori and his wife Fumiko. The days of his youth were shadowed by the war and disorders that followed. Enduring all the obstacles, he graduated in mathematics from the University of Tokyo in 1954 and was admitted to the graduate school of the same university. It was those days when he started study on topology, which has become his lifetime theme, without a single predecessor around him in this field. He graduated in 1959 with the Degree of Doctor of Science, under the supervision of Professor Shôkichi Iyanaga. Immediately afterwards he was appointed Assistant of Department of Mathematics and in 1961 promoted to Associate Professor of College of General Education. In 1966 he was invited to join Department of Mathematics, Faculty of Science, where he was promoted to a full professorship in 1973. After a celebration of his sixtieth birthday he retired from the University of Tokyo in the spring of 1990 and moved to a newly founded Department of Mathematics of Meiji University. He is now serving as the President of the Mathematical Society of Japan.

In 1950's, when Professor Hattori started his mathematical career, topology was in the midst of its rapid progress. In particular a new branch called differential topology has been founded by R. Thom, J. Milnor and S. Smale. The most distinctive feature of their methods is to reduce geometrical problems in manifold theory to those of algebraic topology and then to solve them by powerful tools. Professor Hattori's method is basically on the same line, but with emphasis on the latter step. His first discovery which was done in his graduate student days was concerned with the spectral sequence of de Rham cohomology.

In early 1960's, M. Atiyah and F. Hirzebruch introduced a powerful method called topological K-theory and obtained various fundamental results. With this theory as well as that of characteristic classes in hand, in 1966 he established an integrality theorem of characteristic numbers of weakly almost complex manifolds, the result now known as the Hattori-Stong theorem. He decided precisely those characteristic numbers which take integral values on every such manifolds, thereby answering the conjecture of Atiyah-Hirzebruch. It is through this outstanding work that he won a worldwide recognition. Another im-

portant result in this direction is concerned with genera of ramified coverings. He obtained a formula for various genera of a ramified covering in terms of the data about the branching locus and the base manifold. This is a natural generalization, from a new standpoint, of Hirzebruch's result on signatures.

In 1970's he embarked upon study of the theory of transformation groups on manifolds, mainly that of S^1 actions. An important discovery in this decade is an essential generalization of the vanishing theorem of Atiyah-Hirzebruch to the context of almost complex manifolds with S^1 actions.

The study of the constraint on the topology of manifolds which admit S^1 actions was continued in 1980's, in a way to pursue the resemblence with positively curved manifolds.

In his late fifties, he was even more productive, investigating S^1 actions from various viewpoints. It is a logical consequence of his keen interest in mathematics that he will continue to be so in his sixties or more ahead.

Apart from mathematics, he enjoys a happy home life with his wife Tsuyako and with two sons. He started skiing in his fifties. Despite a fracture in the very first experience, this hobby has been continued.

Professor Hattori has been undoubtedly one of the most influential mathematicians in Japan, with many former students now working actively in various fields of topology. He contributed significantly to the foundation and the flourishing of Japanese school of transformation groups. Not only his students but also many of his contemporaries have benefited from his company; his sincere attitude, his wide and accurate knowledge and his pioneering achievements in mathematics. Especially topologists of younger generations owe very much to his warm personality and enduring encouragement.

It is a great pleasure for us all, colleagues, friends and students to have this occation to express our sincere respect and hearty gratitude to him.

S. Matsumoto and S. Morita

Publications of Akio Hattori

Papers

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著　　書

(単著)

多様体 (岩波全書)	岩波書店	昭和51年6月
位相幾何学 I (岩波基礎数学講座)	岩波書店	昭和52年5月
位相幾何学 II	岩波書店	昭和53年3月
位相幾何学 III	岩波書店	昭和54年2月

(共著)

位相幾何学 (現代数学演習叢書)	岩波書店	昭和40年9月
線型代数入門	紀伊国屋書店	昭和62年1月
数学の学び方	岩波書店	昭和62年10月