

Preface

Friedrich E.P. Hirzebruch was born on October 17, 1927 in Hamm, Germany. He studied at the University of Münster and at the Eidgenössische Technische Hochschule Zürich from 1945 to 1950.

He has made fundamental contributions to many parts of mathematics. One of his most celebrated results is the Hirzebruch-Riemann-Roch theorem, which was proved by him when he was visiting the Institute for Advanced Study, Princeton, during the period 1952-1954, and published by him in 1956 in an instant classical book entitled “Neue topologische Methoden in der algebraischen Geometrie”. According to an article “Curriculum vitae mathematicae” in 1987 by Grauert, Harder and Remmert, “this brought him fame overnight, for this was a problem that many of the top mathematicians of the day had been working on.”

He founded the famous yearly Arbeitstagungen (meetings) in 1957, and established the Max-Planck-Institut für Mathematik in Bonn in 1980. His deep contributions to mathematics and dedicated service to the mathematical community have been recognized by many awards and honors.

For example, “... *for outstanding work combining topology, algebraic and differential geometry, and algebraic number theory; and for his stimulation of mathematical cooperation and research*”, he was awarded the Wolf prize in 1988. The award citation also says that:

“For the past three and a half decades, the name of Professor Friedrich Hirzebruch has been connected with famous results in the areas of topology, algebraic geometry, and global differential geometry, results which all mark the beginning of important theories and which have had an enormous influence on the development of modern mathematics. Hirzebruch’s achievements include

1. the discovery of the signature theorem for differentiable manifolds and the formulation and proof of the Riemann-Roch theorem for algebraic varieties,
2. the integrality theorem for characteristic classes of differentiable manifolds,
3. the proportionality theorem for complex homogeneous manifolds and (with Armand Borel) the general theory of characteristic classes of homogeneous spaces of compact Lie groups,
4. complex K-theory and its spectral sequence and various geometrical applications (with Michael Atiyah),
5. the ‘topological’ proof of the Dedekind reciprocity theorem through 4-manifold theory and other fascinating relations between differential topology and algebraic number theory,
6. the systematic study of Hilbert modular-forms and-surfaces and their relation to class numbers.

Many mathematicians have expanded and generalized Hirzebruch's ideas. He himself has always been interested in the beautiful particular case and concrete problem, which he solves by creating new methods that combine unusual geometric, algebraic, and arithmetic intuition. Moreover, through his brilliant lecturing and writing, through the "Arbeitstagung Bonn" (yearly international meetings at the highest level), and through his dedicated work in scientific organizations he has greatly stimulated world-wide cooperation in research."

His other major awards include the Lobachevsky Prize from the Russian Academy of Sciences in 1989, the Seki-Takakazu Prize of the Mathematical Society of Japan, the Einstein Medal in 1999, the Stefan Banach Medal of the Polish Academy of Sciences, and the Cantor medal of the German Mathematical Society in 2004. He was also awarded the Order of the Sacred Treasure in 1996 by the emperor of Japan.

He is a member of many prestigious Academies including the German Academy of Scientists Leopoldina, the National Academy of Sciences of USA, the Russian Academy of Sciences, the Paris Academy of Sciences, and the Royal Society of London.

He is doctor honoris causa of institutions in Germany and several other countries.

To celebrate the 80th birthday of Professor Hirzebruch, the editors of PAMQ decided to publish two special issues in his honor.

We hope that these two special issues could convey a sense of the great impact of his work, and deep admiration and respect of his fellow mathematicians towards him. Indeed, as Atiyah wrote in 1996, "... *By his ideas, his example, his influence and his leadership he has played a distinctive and unique role in the mathematics of our time.*"

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