Pakistan Mathematical Society

Newsletter
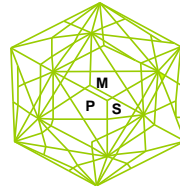
EDITORIAL

Mathematical Societies and Academies of Sciences have played significant role in the development of science in general and mathematics in particular. The societies of the modern times, which have made a mark on the history pages of mathematics, are many. They are wealthy and very large organizations working in the service of mathematics in their respective countries.

Realizing the important role these societies are playing in the development of mathematical sciences, their respective governments have patronized them. This has enlarged the scope of these societies and hence, their influence is global. These societies are keeping the mathematical community abreast with the latest trends in mathematics, laying the foundation on a year-to-year basis for the development of mathematics, and working as think tanks in helping to form adequate policies for better science and technology.

But this has been achievable because the governments have realized that technical jobs, such as the formation of policies for the development of mathematics, should be left to the organizations who have the expertise.

The problem in Pakistan is that there is no permanence in the function and the number of mathematical societies and associations that we have. Almost all societies and associations remain dormant. They wake up all of a sudden and then go back to sleep as quickly as they wake up.

Their main aim is to organize a conference. Once the conference is over, the society becomes dormant. During the conferences, the main chunk of grants for the conference is spent on the "inaugural ceremonies" for the sake of publicity and "personal relations" and for personal benefits that can shower on those who matter in the societies.

Members are usually "life members", meaning that basically one pays a nominal fee once and then remains a member even after he/she dies. Their names remain in the list to show off the numbers for sake of giving the false impression that they are the "biggest" society.

The societies should have various activities conducted continually on a regular basis. There should be permanence in their activities. They should sustain and synchronize their activities for the benefit of mathematics and the mathematical community. Only in this way a society can work as an institution. Why has there been only one mathematical society in Pakistan in 60 years, which is registered and has been holding several activities on a regular basis since its inception?

THE ABEL PRIZE FOR 2004

The second Abel Prize has been awarded jointly to Michael Francis Atiyah and Isadore M. Singer. The Atiyah-Singer index theorem is one of the great landmarks of twentieth century mathematics, influencing profoundly many of the most important later developments in topology, differential geometry and quantum field theory. Its authors, both jointly and individually, have been instrumental in repairing a rift between the worlds of pure mathematics and theoretical particle physics, initiating cross-fertilization, which has been one of the most exciting developments of the last decades.

We describe the world by measuring quantities and forces that vary over time and space. The rules of nature are often expressed by formulas involving their rates of change, so-called differential equations. Such formulas may have an "index", the number of solutions of the formulas minus the number of restrictions, which they impose on the values of the quantities being computed. The index theorem calculated this number in terms of the geometry of the surrounding space.

A simple case is illustrated by a famous paradoxical etching of M.C. Escher, "Ascending and Descending", where the people, going uphill all the time, still manage to circle the castle courtyard. The index theorem would have told them this was impossible!

The Atiyah-Singer index theorem was the culmination and crowning achievement of a more than 100-year old development of ideas, from Stokes's theorem, which students learn in calculus classes, to sophisticated modern theories like Hodge's theory of harmonic integrals and Hirzebruch's signature theorem.

The problem solved by the Atiyah-Singer theorem is truly ubiquitous. In the 40 years since its discovery, the theorem has had innumerable applications, first within mathematics and then, beginning in the late 70's, in theoretical physics: gauge theory, instantons, monopoles, string theory, the theory of anomalies, etc.

At first, the applications in physics came as a complete surprise to both the mathematics and physics communities. Now the index theorem has become an integral part of their cultures. Atiyah and Singer, together and individually, have been tireless in their attempts to explain the insights of physicists to mathematicians. At the same time, they brought modern differential geometry and analysis as it applies to quantum field theory to the attention of physicists and suggested new directions within physics itself. This cross-fertilization continues to fruitful for both sciences.

Isadore M. Singer was born in 1924 in Detroit, and received his undergraduate degree from the University of Michigan in 1944. After obtaining his Ph.D. from the University of Chicago in 1950, he joined the faculty at the Massachusetts Institute of Technology (MIT). Singer has spent most of his professional life at MIT, where he is currently an Institute Professor.

Singer is a member of the American Academy of Art and Sciences, the American Philosophical Society and the National Academy of Sciences (NAS). He served on the Council of NAS, the Governing Board of the National Research Council, and the White House Science Council. Singer was vice president of the American Mathematical Society from 1970 – 1972.

In 1992 Singer received the American Mathematical Society's Award for Distinguished Public Service. The citation recognized his "outstanding contribution to his profession, to science more broadly and to the public good."

Among the other awards he has received are the Bôcher Prize (1969) and the Steele Prize for Lifetime Achievement (2000), both from the American Mathematical Society, the Eugene Wigner Medal (1988), and the National Medal of Science (1983).

When Singer was awarded the Steele Prize his response, published in the Notices of the AMS, was: "For me the classroom is an important counterpart to research. I enjoy teaching undergraduates at all levels, and I have a host of graduate students, many of whom have ended up teaching me more than I have taught them." Singer has also written influential textbooks that have inspired generations of mathematicians.

Michael Francis Atiyah was born in 1929 in London. Atiyah got his B.A. and his doctorate from Trinity College, Cambridge. The greatest part of his academic career Atiyah has spent in Cambridge and Oxford. He has held many prominent positions; among them the highly prestigious Savilian Chair of Geometry at Oxford and that of Master of Trinity College, Cambridge. Atiyah has also been professor of mathematics at the Institute for Advanced Study in Princeton.

Atiyah rejuvenated British mathematics during his years at Oxford and Cambridge. He was also the driving force behind the creation of the Isaac Newton Institute for Mathematical Sciences in Cambridge and became its first director. Atiyah is now retired and an honorary professor at the University of Edinburgh.

Michael Francis Atiyah has received many honours during his career, including the Fields Medal (1966). He was elected a Fellow of the Royal Society in 1962 at the age of 32. He was awarded the Royal Medal of the Society in 1968 and its Copley Medal in 1988. Atiyah was president of the Royal Society from 1990 to 1995. Atiyah has served as president of London Maths Society (1974 – 1976). He has

also played an important role in the shaping of today's European Mathematical Society (EMS).

Atiyah was responsible for the founding of the Inter-Academy Panel that brought together many of the worlds academies of science. The Inter-Academy Panel has now been permanently established and will play a major role in the integration of scientific policy throughout the world. Atiyah also instigated the formation of the Association of European Academies (ALLEA). Atiyah has been president of Pugwash Conferences on Science and World Affairs.

Among the prizes he has received are the Feltrinelli Prize from the Accademia Nazionale dei Lincei (1981) and the King Faisal International Prize for Science (1987). Michael Francis Atiyah was knighted in 1983 and made a member of the Order of Merit in 1992.

IMPORTANCE OF MATHEMATICS IN SCIENCE CURRICULA

A seminar on importance of mathematics in science curricula was held at Preston University, Islamabad Campus recently. The Chief Guest, Professor Dr Qaiser Mushtaq, said that the true nature of mathematics and what it is about is not well known. The importance of mathematics can be appreciated only when it is viewed from the proper perspective, said the professor. He opined that the view of mathematics only as a service subject is detrimental to the development of science and technology in Pakistan. He said that it is the responsibility of the mathematicians and mathematics teachers to first understand the true nature of mathematics. Professor Mushtaq said that the planers and policy makers in the government should not be misled by a few "mathematical salesmen" who misguide them in order to project their speciality as the "only useful branch of mathematics". While drafting a science curriculum, he emphasized, competent, relevant and honest mathematicians should be engaged.

Professor Shahid Afzal, Dean, Information Technology, Preston University while expressing his views said that mathematics was not given its due place. He said that there is a need to make mathematics interesting.

Dr. Sarwar Kamran, Dean Natural Sciences, Riphah International University, Islamabad, told the audience that Mathematics was important, is important, and will remain important.

Dr Nasr, Professor in Management Sciences, Comsats, Islamabad expressed his views that Mathematics is not only important in natural sciences but also in Biology, Ecology, Medical, and all branches of engineering and management sciences.

PROFESSOR GRAHAM HIGMAN IN PAKISTAN
**Qaiser Mushtaq**

In July 1987, Professor Qaiser Mushtaq organized a unique mini conference on algebra, the first such international activity in algebra in the history of Pakistan.

Professor Graham Higman FRS, former Waynflete Professor of Pure Mathematics at Oxford University and former President of the London Mathematical Society, was invited to deliver lectures at the conference. The conference was attended by mathematicians from all over Pakistan and was sponsored by the National Academy of Higher Education, (University Grants Commission) and the Quaid-i-Azam University, Islamabad, Pakistan. Professor Graham Higman FRS delivered four one-hour lectures. Experts and senior students from all over the country attended the conference.

Professor Higman flew to Pakistan from Singapore where he had attended an international conference on Group Theory in June 1987 where many eminent group theorists also attended, and Professor Higman who was one of the keynote speakers. Professors Mario Suzuki and J.P.Serre and many other such mathematical giants were amongst his audience. His lecture was as usual rich with outstanding mathematical substance. In his typical scholarly style, he won the hearts of audience.

I had the honour to be a doctoral student of Professor Graham Higman with whom I spent three years at Oxford from 1980 to 1983. When Professor Higman retired from Oxford in 1984, an international conference was held in his honour. I had returned to Islamabad by then working as a lecturer in mathematics at Quaid-i-Azam University. Surmounting several obstacles created by the University Grants Commission, Ministry of Education and the Ministry of Finance, I finally obtain the travel grant and the No Objection Certificate to proceed abroad to attend the conference held in Professor Higman's honour.

That was my first meeting with Professor Graham Higman after having returned from Oxford obtaining D.Phil. from there by writing a thesis on Coset Diagrams for the Modular Group. Coset diagrams are visible in the background of Professor Higman's portrait, by Norman Blamey, which was displayed in the Higman Seminar Hall in the Mathematical Institute, 24-29 St Giles, at Oxford.
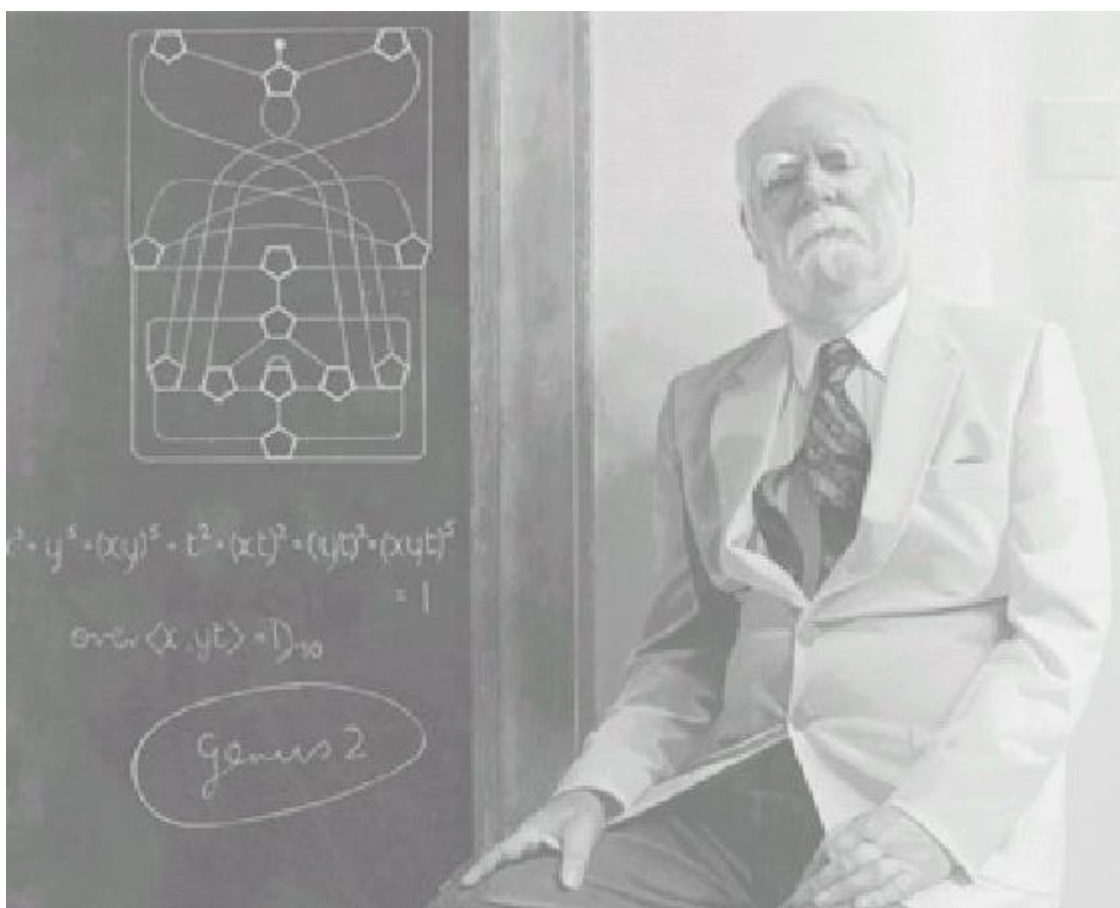
My next meeting with Professor Higman was at a conference three years later in Singapore in 1987 where I went to read a paper. I remained in Singapore after the conference and had the opportunity to have several meetings with him. Professor Higman had returned from Illinois at Urbana Champagne where he spent about two years. He was now on his way home to Headington in England, and I requested him to spend some time in Islamabad before returning to Oxfordshire. Luckily, he agreed.

Professor Higman spent some three weeks in Pakistan. I organized a four-day conference at the Mathematics Department, Quaid-i-Azam University. The mini-conference attracted a handsome number of participants from all over the country. Professor M.Rauf Qureshi, Professor Asif Kazi, Professor Karamat Hassan Dar, and Professor Khuda Dino Soomro were amongst them.

At the end of the conference, Professor Higman and the participants were brought to Murree Hills for recreation.

During his visit to Pakistan, Professor Higman was requested by the Pakistan Television (PTV) for an interview in the then popular programme, Visitor's Book. I was asked to interview him. The interview lasted for about twenty minutes. For several days afterwards, I kept receiving comments, messages, and questions for Professor Higman.

Professor Higman is famous for his difficult and breakthrough results in mathematics. His work on the famous "Embedding Theorems, Hignam-Neumann-Neumann Extensions, and Finite Simple Groups are a few examples.

(M.Iqbal, Q. Mushtaq, G.Higman, Abdul Karim, M.Aslam, and M.Sharif)

After the conference, Professor Higman wanted to take respite from mathematics for a while and spend some time on his own watching birds in some remote area. I therefore arranged a trip for him to Gilgit. He asked my wife and I to accompany him, but I preferred to do otherwise. . He spent about ten days in Gilgit, and returned to Islamabad by road due to uncertainty of the weather. The journey took around 18 hours, and when he eventually arrived at my place, he looked very tired. I took him straight to Hotel Margala for an overnight stay. Next day, in the evening we had the interview at the PTV on 16th August 1987. I enjoy recalling his comments at the end of the interview: "We do fundamental research, not only to acquire results solely but because the process is an ennobling one; it is one that makes you more worthwhile than before; it is something that if you cut yourself off, you are making yourself less human than you ought to be."

THE SECOND INTERNATIONAL CONGRESS
IN ALGEBRAS AND COMBINATORICS, JULY, 2007
6-11 July, 2007-Beijing, China and 12-15 July, 2007-Xi'an, China

The second international congress of Algebras and Combinatorics will be held in Beihang University, Beijing, 6th-10th July, 2007, and Xi'an University of Architectural Technology, Xi'an, 11th-14th July, 2007. The topics in Beijing will be Group, Ring, Lie algebra, Theory of Combinatorics, etc., and the topics in Xi'an will be Semigroup, Semiring, Applied Combinatorics, Fuzzy Algebra and Theorectical Computer Science.

For information, refer to the website: http://ss.buaa.edu.cn/icac07 (Beijing) and http://202.200.144.17/ICAC (Xi'an).

PETRA INTERNATIONAL CONFERENCE ON MATHEMATICS, JORDAN

The preparatory committee of Petra International Conference on Mathematics is pleased to invite you to participate in the conference to be held at Al-Hussein Bin Talal University, Jordan, Oct 23-25, 2007. Papers from all areas of mathematics and statistics stated below are very welcome. Selected (refereed) papers will be published in a special volume of the conference proceedings.

Besides the academic activities, the organizers will arrange tours to some wonderful places in Jordan including Petra itself. The hosting institute, Al-Hussein Bin Talal University, will support generously all costs except tickets to/from Jordan.

The preferred language of the conference is *English*. However, *Arabic* can be used as a second language.

The objectivities of the conference are to provide a precious opportunity to present the latest theoretical research results and new advances in all areas of mathematics and statistics to a wide audience of distinguished professors and students who work in different disciplines, to develop stronger ties among them, and to discuss questions of great current interest, and to suggest open problems.