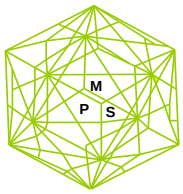
Pakistan Mathematical Society

Newsletter



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EDITORIAL

There is a general misconception that mathematics is about calculations and symbols. Hence the common view that, by mastering the skills of mathematical manipulations, one can solve everyday problems. The public thus gets this wrong impression of mathematics that by the use of an equation or a formula one can solve all the social, economic and environmental problems of a country. It is a matter of historical record that this "utilitarian approach" towards mathematics has ruined a genuine scientific culture, which is an important part of the infrastructure for the development of a country.

Had motivational force of mathematics been only its applications, creation of matrices, linear operators or differential equations connected with waves would not have taken place. Mathematics is about ideas and the way different ideas relate to each other.

Too much emphasis on this aspect of mathematics can deprive students from having a sound foundation of mathematics. It is therefore imperative that proper and balanced emphasis is laid on the applications of a mathematical concept.

Mathematics is misconstrued as a quantitative science in Pakistan. Common use of terms like “pure mathematics” and “applied mathematics” have had adverse effects on our students. They have started believing that pure mathematics is a useless branch of mathematics and is meant only to provide a foundation for learning mathematics at a secondary and a tertiary level. They think after learning pure mathematics, one is good only for teaching. Whereas on the other hand, by specializing in applied mathematics one will have more working options and can avoid being a teacher, which in Pakistan is not very popular profession.

As a consequence, the young generation is opting more for so-called applied mathematics than mathematics, which is commonly and wrongly called pure mathematics. Too much emphasis on only a very small part of mathematics at the cost of ignoring the real mathematics is creating a class of mathematicians who are neither good in mathematics nor are able to apply it in the real sense. If the situation is not reversed soon, Pakistan will be out of the international mathematical market.

THE ABEL PRIZE FOR 2006

The Norwegian Academy of Science and Letters awarded the Abel Prize for 2006 to Lennart Carleson of Royal Institute of Technology, Sweden, for his profound and seminal contributions to harmonic analysis and the theory of smooth dynamical systems.

In 1966, to the surprise of the mathematical community, Carleson broke the decades-long impasse by proving Lusin's conjecture that every square-integrable function, and thus in particular every continuous function, equals the sum of its Fourier series "almost everywhere".

Carleson has made many other fundamental contributions to harmonic analysis, complex analysis, quasi-conformal mappings, and dynamical systems. Standing out among them is his solution of the famous corona problem, so called because it examines structures that became apparent "around" a disk when the disk itself is "obscured", poetically analogous to the corona of the sun seen during an eclipse. In this work he introduced what has become known as Carleson measures, now a fundamental tool of both complex and harmonic analysis.

The influence of Carleson's original work in complex and harmonic analysis does not limit itself to this. For example, the Carleson-Sjolin theorem on Fourier multipliers has become a standard tool in the study of the "Kakeya problem", the prototype of which is the "turning needle problem": how can we turn a needle 180 degrees in a plane, while sweeping as little area as possible? Although the Kakeya problem originated as a toy, the description of the volume swept in the general case turns out to contain important and deep clues about the structure of Euclidean space.

Carleson's work has forever altered our view of analysis. Not only did he prove extremely hard theorems, but the methods he introduced to prove them have turned out to be as important as the theorems themselves. His unique style is characterized by geometric insight combined with amazing control of the branching complexities of the proofs.

The impact of the ideas and actions of Lennart Carleson in not restricted to his mathematical work.

He has played an important role in the popularization of mathematics in Sweden. He wrote the popular book "Matematik for var tid" ("Mathematics for our time"), and he has always been interested in mathematical education.

Carleson has had 26 Ph. D. students, many of whom became professors at universities in Sweden and elsewhere. As Director of the Mittiag-Leffler Institute near Stockholm from 1968-1984, he realized the original vision of Mittag-Leffler, building the Institute as we now know it, a foremost international research centre in mathematics.

He has been president from 1978 to 1982 of the International Mathematical Union (IMU) and of the Scientific Committee of the fourth European Congress in Mathematics, in 2004, he started the initiative of the Science Lectures, where distinguished scientists discuss the most relevant aspects of mathematics to science and technology.

Lennart Carleson is an outstanding scientist with a broad vision of mathematics and its role in the world.
The Norwegian Academy of Science and Letters has decided to award the Abel Prize for 2006 to Professor Carlson,

AN INTERVIEW WITH PROFESSOR GRAHAM HIGMAN ON PTV
Interviewer: Qaiser Mushtaq
Transcriber: Shayyan Qaiser

Question How did you become interested in group theory?
Answer Yes certainly, of course I first become interested in mathematics in general when I was at school, in the way most school children choose a subject, it happened to be the subject that I was best at. While I was an undergraduate, I was interested in several branches of mathematics. When I became a research student under Henry Whitehead, who was of course a topologist, he put me on to a problem in group theory with the intention that it should be applied later on in topology, and I got as far as the group theory, but I got stuck there, so in a way you could say that I'm a failed topologist if you like and that's really why I'm a group theorist. But of course, as a group theorist yourself you probably don't want to see it in those terms.

Question Why do you think that the study of group theory is important?
Answer Well, like many other research mathematicians, I do what I do not only because I think its important, but because I think its interesting. The problems that one has to deal with in group theory are challenging. They are intellectually difficult and when 1 has got into a problem, its not so much as the question of how much it has an application to the real world that concerns you, its a question of exercising your mind, exercising the control that the mind has over the

things it understands. Of course it is true that group theory has applications in the sciences, perhaps we should say for the benefit of most of the people who are likely to be listening to us and have no idea what group theory is, that group theory is in fact the study of symmetry. What a group theorist is concerned with is the possible amounts of symmetries that an object can have. Symmetry in the abstract is our study and because everything has some degree of symmetry, and because a physical scientist, for instance, who is studying a problem, finds it easier to deal with if he takes the symmetry into account. He needs to know what kinds of symmetries there are, and he therefore needs to know the results of group theory, and it is in that way that group theory acts as a servant of other sciences as well as being an interesting subject in its own right.

Question The students would like to know what direct applications group theory has in some of the basic sciences.

Answer To know the direct applications, you have to ask the scientists, you have to ask the physicists. A great many of the recent developments in group theory, in particular, in representation theory of certain groups, have been carried out not by people who regard themselves as mathematicians in the first place, but by people who regard themselves as physicists. They do them not because they are interested in mathematics in its own sake, but because it makes the work of physicist easier, and if your student asks you that sort of question, you point them to that kind of answer.

Question In some countries, set theory is introduced to students at an early stage. What do you think about this?

Answer It depends how much you do, and the sprit with which you do it. Set theory is probably a natural language for talking about things that occur in everyday life, provided you don't try and develop a very abstract and harried sort of way. I think children enjoy it, and anything that children enjoy, there should be talk with a reason, and if they can be talked to enjoy mathematics, they will be more likely to take it up.

Question Our students and teachers, they think, that set theory in those classes is quite abstract and axiomatic, and when the students don't see any direct application, they find it very abstract.

Answer This is natural, but there are many examples that you can give to show that it is a useful language. I think if you try to teach it as an axiomatic science, you will not get any response form children because the power and the attraction of an axiomatically developed subject, is something that comes to students later in life. For university students, it can very often be a very interesting and exciting thing but

the younger child's mind is much more concrete and therefore you have to begin with the more concrete things. We don't begin with the axiomatic; we begin with the practical situations, which we activitise later when we want to form a theoretical subject.

Question The most confusing thing for a student is the definition of "set", as it is not well– defined as such.

Answer The passion for exact definitions is another thing that comes later in life. The developing mathematicians or undergraduate knows he needs the exact definition if he is going to get exact proofs. But we don't begin that way. That is the level of abstraction that you reach later on and you reach it because it is necessary to the subject, it makes the subject powerful when you get to it but to try and introduce it into the mind of a child to soon, then the child just curls up and runs away. So its not a good thing.

Question In my opinion, advancement and perfection of mathematics are intimately connected with the progress and prosperity of the state. Do you think that a country can progress without giving due respect to fundamental research in mathematics?

Answer If you are living in a country, which is blessed with fertile soil and comfortable climate, you can live without any intellectual life at all. The intellectual life is not in a way necessary to human existence. You may feel that as an unsatisfactory argument in many ways, and you may feel it would be a limited life. But if you happen to live in a country, which doesn't have those benefits, you need it for various things, but u can't give a perfectly satisfactory answer to such questions. We happen to face the fact that we don't do mathematics solely, or even primarily because of its economic benefit, we do it primarily because it is, as one French mathematician told another, "the glory of the human mind, that is involved", and if we are not prepared to do mathematics or other exact sciences for the glory of the human mind then we almost most certainly wouldn't do them at all. The fact that they have economic benefits as consequences is incidental.

Question There is school of thought, which believes that instead of developing your own fundamental sciences, why not to acquire technical know how from the developed countries and use them, rather than developing your own fundamental sciences and reaching to that point where you start producing things on your own.

Answer This argument has more force if you are talking about technology than if you are talking about fundamental science. If you are talking about technology, it is important to consider the time factor. If you are insisting on developing your own technology, that's going to take you a long time. But if you acquire technology from

somewhere else, you can use it right away, but as far as fundamental research goes I think the case is different. You do fundamental research not in order to acquire the results solely but because as I said the process is such that it makes you more worthwhile than you were before, and if you cut yourself form all that, you are making yourself less human than you ought to be or so it seems to me, and I think we have to take that line.

Question Did you find Pakistan any different form the picture that you had in mind before you arrived here?

Answer Its always hard when you come to a new country and you wait there for about five days to remember what you thought it would be like before you get there as a matter of fact. I don't think that I find it very different. I do remember when I first came here knowing that it was the end of a hot dry summer and that the monsoon hadn't yet broken. I was a little surprised to find how green the place was and I was little surprised to find how near to the mountains Islamabad was, but these are sorts of small things, aren't they? I would also say that concerning the workshop in algebra that we have just been through, I was pleasantly surprised by the enthusiasm and the standard of knowledge of the participants, and it went very well, and apart from those two things I am not sure that there is anything I would want to say that surprised me in Pakistan.

PAKISTAN JOINS THE WORLD IN CELEBRATING TERCENTENARY BIRTH ANNIVERSARY OF EULER

A symposium was held at the auditorium of the Pakistan Science Foundation (PSF) on 12 June 2007 to mark the 300th birth anniversary of the renowned Swiss mathematician, Leonhard Euler. The chief guest at the occasion was the deputy head of the Swiss Embassy in Islamabad, Mr. K.Obolensky.

The mathematical community all over the world has been celebrating the tercentenary birth anniversary of Leonhard Euler (16th April 1707). Switzerland, the birth country of Euler commemorated his birth by publishing special postage stamps and holding various functions highlighting his life and contributions to mathematics. Mathematical societies and academies in other countries have also been organizing symposia, lectures, exhibitions, etc. in his memory.

To join the world in celebrating Euler's influence on science in general and mathematics in particular, the Pakistan Mathematical Society in collaboration with the Pakistan National Science Foundation in organizing the symposium at the PSF Auditorium in Islamabad.

Amongst the speakers at the symposium were Professor M. Riazuddin, Director, National Centre for Physics, Professor Dr Qaiser Mushtaq, President, Pakistan Mathematical Society and Professor at Quaid-i-Azam University, Professor Dr M.Sarwar Kamran, Riphah International University, and Dr Khalid Rashid, Bahria University.

Professor Mushtaq highlighted the impact of Euler's fundamental theories in pure mathematics. Dr Khalid Rashid spoke about Euler's contribution in the development of defence weaponry in the 18th century that greatly helped Zar's in Russia. Professor Riazudin explained the simplicity of Euler's mathematical theories.

Dr. N.M.Butt, Scientist Emeritus and the Chairman PSF, thanked the guest speakers for their contributions in highlighting the achievements of one of the greatest mathematicians of the 18th century who had such lasting impact on science. He briefed the guests of the about the important role that PSF is making in developing science and technology in Pakistan.

COMSTECH PRIZE IN MATHEMATICS

The Organization of Islamic Conference Standing Committee on Scientific and Technological Cooperation (COMSTECH) announces the award of biennial prizes, which are intended to encourage and support scientific contributions in Physics, Chemistry, Mathematics and Biology. Presently it is requesting nominations in the fields of Physics and Mathematics.

Nominations for the COMSTECH Prizes are invited from science academies, national research councils, universities, research institutions and internationally distinguished scientists in OIC member countries. Each Prize consists of a cash award of US$5000 and a personalized plaque mentioning the recipient's major contributions.

The nominations should clearly state the contributions made in the fields for which the Prize would be given. Nominations must be submitted in the English language. A 1-2 page profile of the nominated individual, a list of publications relevant to the Prize, the biodata of the candidate and latest passport size colored photograph should accompany the nominations. Nominations will be judged by committees of distinguished scientists appointed by Coordinator General COMSTECH.

Since these Awards will be made on the basis of outstanding contributions and achievements of excellence, it is important that only those scientists are nominated who have achieved international recognition and published extensively in leading scientific journals of

high international reputation. There is no specific form for nomination. A cover letter along with the relevant nomination papers must reach COMSTECH Secretariat not later than 31 August 2007.

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ONFERENCES AND WORKSHOPS

Summer Conference in Mathematics
30 – 31 July 2007, Lahore, Pakistan

Centre for **A**dvanced **S**tudies in **M**athematics, LUMS is organizing Summer Conference in Mathematics for two days (30th and 31st July 2007). The main motivation for this conference is to promote interaction between researchers and generate cross-fertilization of ideas in various sub specializations of Mathematics. Registration is FREE, but participation is by invitation only.

Organizing Committee: M. Aslam Butt (Convener), M. Naeem Qureshi, M. Yaseen, Asma Rashid Butt, Kashif Nazar.

Venue: Lahore University of Management Sciences (LUMS), Lahore.

8th International Pure Mathematics Conference 2007
24 – 26 August 2007, Islamabad, Pakistan

The 8th International Pure Mathematical Conference 2007 (8th IPMC 2007) is the 8^{th} international conference in the series of Pure Mathematics Conferences that take place in Islamabad every year in August. It is a thematic conference on Algebra, Geometry, and Analysis held under the auspices of the Pakistan Mathematical Society. There will be free housing for local participants. Several recreational trips will be organized in and around Islamabad introducing the unique local and multi-ethnic culture.

Please fill in the on-line registration form at www.pmc.org.pk and find more information therein. The conference is convened by Professor Dr Qaiser Mushtaq in collaboration with Quaid-i-Azam University and Preston University. It is supported by the Higher Education Commission, Pakistan Science Foundation, and Currentage International Marketing (Pvt) Ltd.

Petra International Conference on Mathematics
23-25 October 2007, 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 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.