ASSOCIATE MEMBERSHIP APPLICATION TO THE

INTERNATIONAL MATHEMATICAL UNION

ECUADORIAN MATHEMATICAL SOCIETY (SEDEM)

HISTORY

The beginning of the academic mathematics history in Ecuador goes back to the year 1869, when the first technical university ("Escuela Politécnica Nacional", EPN) was founded as a part of the former Central University "Santo Tomás" at Quito. The first ecuadorian Faculty of Mathematics was a constituve part of this new high education institution. Its initial academic activities were coordinated by the german and italian scholars Revd. Johannes Baptist Menten, Revd. Teodor Wolf, and Revd. Luis Sodiro.

For more than a century, courses on mathematics were offered at universities only as support for engineering and similar careers. This changed in 1975 when the Department of Mathematics was created at the – meanwhile independent – National Polytechnic School ("Escuela Politécnica Nacional", EPN) in Quito, with the enthusiastic help of Bernard Chevreau (France) and William Voxman (USA), who spent three and one years in Ecuador, respectively. A first generation of ecuadorian mathematicians were educated there and were afterwards supported for graduate studies abroad.

After obtaining their Ph.D. degrees at universities in Europe and the United States, some of these mathematicians returned to Ecuador during the 80's. Most of them joined the Department of Mathematics at EPN as professors, while others supported the creation of new careers in mathematics at other ecuadorian universities. At present, programms of study in mathematics are offered at other high education institutions, the "Escuela Politécnica del Litoral (ESPOL)" at Guayaquil, the "Universidad San Francisco de Quito (USFQ)" and the "Universidad Central (UCE)" at Quito.

The Ecuadorian Mathematical Society ("Sociedad Ecuatoriana de Matemática" SEdeM) was formed in 1967 at the initiative of some enthusiastic professors interested in the fostering of mathematics in Ecuador. Originally, its main goal was the improvement of the quality of education in mathematics at all levels countrywide. Later on, this goal was extended and since then the SEdeM is expected to provide a place where Ecuadorian mathematicians can exchange ideas and devise concrete actions aiming at the enhancement of the general background

conditions for both research and education in mathematics in Ecuador. Currently the Ecuadorian Mathematical Society has 41 members.

One example of such concrete actions have been the Ecuadorian Conferences on Mathematics, organized since 1986 by the Department of Mathematics at EPN on a biennial basis. These conferences follow three main objectives: on one side, they intend to support improving the level of education in mathematics through specialized courses addressed to school teachers; additionally, they constitute a forum where Ecuadorian professors and researchers have the opportunity to exchange ideas and propose possible new topics of research, in most cases with the presence of prominent foreign invited speakers; finally, mathematicians working outside academia (a fast growing group in Ecuador in recent years) expose their experiences in the form of talks directed to a broader audience of professionals.

Adverse economic conditions and wrong policies lead to a general crisis and massive emigration in Ecuador during the nineties. As a consequence, public education suffered from a sustained drop in quality, and mathematics was not the exception. To take a single eloquent example, no new position could be opened for more than ten years at the Departament of Mathematics at EPN, due to the lack of properly qualified candidates. Similar figures were registered at the other universities. Professors were overloaded with teaching duties and research almost stagnated.

This situation has started to revert in recent years. A new generation of mathematicians that had obtained their doctoral degrees in Europe and the Americas decided to return to Ecuador and were offered positions in some universities. At the same time, the German Academic Exchange Service agreed to finance a cooperation project between the Department of Mathematics at EPN and the Technical University of Berlin ("Technische Universität Berlin", TU Berlin) aiming at the education of the first PhD students in Ecuador.

Accordingly, there has been a boost in research activities during the last years. The two more recent Ecuadorian Conferences on Mathematics (2004 and 2006) revealed high participation rates of foreign speakers, figures that have been decreasing since more than ten years ago. The SEdeM also profited from this revitalization. In October 2006, a new statute was approved in a General Assembly and a new directory was elected, where both experienced professors and young researchers are represented.[1] Moreover, this new directory was given the explicit mandate to proceed with all efforts to integrate Ecuador into the international community and, within this framework, to apply for an associated membership of the Society into the International Mathematical Union.

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[1]More details can be found at the Societies' webpage: `http://www.math.epn.edu.ec/sedem`

Universities and Education

Although there are 72 universities in Ecuador at the present day, only 10 offer careers related to mathematics. Six of them educate high school mathematics teachers, while the remaining 4 (EPN, ESPOL, UC and USFQ) form mathematicians for working both in academia and industry.

In recent years, these universities have started several postgraduate programs in areas of applied mathematics. Currently there are 6 master programs: three in applied statistics, two in operations research and one in mathematical education. The education is highly applied and has an important impact on many sectors of the society: financial institutions, oil industry, education, etc. The EPN is additionally offering a Ph.D. program in Applied Mathematics since 2003.

The Ecuadorian Mathematical Society and the universities in the country are also deeply involved in the improvement of mathematical education at all levels. Additionally to the master program on mathematical education directed to school teachers and organized by the Universidad Central del Ecuador, mathematicians from different universities are involved in studies about the didactics of mathematics in ecuadorian schools.

In that spirit, conferences across the country are periodically organized in order to give an up to date about the teaching of mathematics. The work is in many cases coordinated with the Ministry of Education of Ecuador.

The support to the organization of mathematical contests has also been an important activity of the society. Currently the SEdeM sponsors the organization of local contests all over the country. A representative national contest is one of the mid term objectives of the society.

Research

Research in pure and applied mathematics in Ecuador has increased significantly during the recent years. From 15 international refereed articles written by ecuadorian mathematicians up to the year 2000, the number has increased to 41 up to the present. The publications appeared in leading journals like *SIAM Journal on Control and Optimization*, *Journal of Algebra* or *Nonlinear Analysis*. Nowadays, the different math departments have active researchers in areas like analysis, algebra, optimization, among others.

In December 2002 the first Ph.D. program on mathematics in Ecuador started. The program was a joint project between the Escuela Politécnica Nacional (EPN Quito), the Technical University of Berlin and the German Academic Exchange Service (DAAD). The Ph.D students, who are about to finish their theses, were formed as highly qualified

researchers capable of formulating mathematical models for practical problems arising from industry and engineering, and designing efficient algorithms for their solution. The first results obtained in their research were presented in several national and international events and submitted for publication to international refereed journals.

The Ph.D. program was also the beginning of more intense research activities at the EPN Quito and induced the creation of the *Research Group on Optimization*[2] at that university. The group has currently 10 members who actively participate in several national and international workshops. There are also several research projects and international cooperations currently going on. As an indicator of this, the group received in the last 5 years the visit of 21 mathematicians from different countries (Austria, Germany, Holland, Switzerland).

Applied research has also been carried out through the different Master programs mentioned before. As a consequence of the increasing applied research, a journal on mathematics and physics (FISMAT) is edited and printed since 1990. The articles appearing there contain the most relevant results obtained in diploma and master theses. Special issues deal with contributions to the Ecuadorian Conferences on Mathematics.

COMMITTEE FOR MATHEMATICS

The following ecuadorian mathematicians constitute the Committee for Mathematics:

- Dr. Germán Rojas
- Dr. Rolando Sáenz
- Dr. Luis M. Torres
- Dr. Polo Vaca
- Mat. Marco Calahorrano

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[2]Details can be found at `http://www.math.epn.edu.ec/resgroup`