THE TEACHING OF MATHEMATICS
2017, Vol. XX, No. 2, pp. 47–63

70 YEARS OF THE MATHEMATICAL SOCIETY OF SERBIA

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Abstract. The Mathematical Society of Serbia was founded in January 1948. During these 70 years of existence, the Society had a broad spectrum of activities: organization of scientific work, concerns for education, popularization of mathematics, etc. In the range of its activities we can quote the editing of five journals as well as a large number of various publications mostly assigned to young mathematician and programmers. The Society is the organizer of all competitions in mathematics and informatics in Serbia and its care is also preparation of Serbian teams for the participation at international competitions. Finally, through the Society, Serbian mathematicians realize their contacts with international associations. Our aim in this paper is to give a brief survey of activities the Society had in the time of its existence. At the end, we also note that some parts of the paper [4] have been reproduced here with the permission and agreement of all its authors.

MathEduc Subject Classification: A30

MSC Subject Classification: 01A74

Key words and phrases: Mathematical society; Mathematical congress; Mathematical olympiad; Olympiad in informatics.

1. Some activities that preceded the founding of the Society

In the period between two World Wars some organized forms of Serbian mathematicians can be registered. In the area of science these mathematicians kept the contact with the universities abroad at which they were educated (Wien, Paris, Budapest, etc.). Besides science, some of them were also engaged in mathematical education. They all participated actively at the International Congresses of Mathematicians and the International Congresses on Mathematical Education as well as at several other mathematical meetings. The names of *Mihailo Petrović*, *Nikola Saltikov*, *Anton Bilimović*, *Jovan Karamata* and others can be found involved in these activities.

In 1926, the mathematicians from the Belgrade University formed the *Mathematical Club* led by *Anton Bilimović*. The main program of its monthly meetings were discussions on scientific results of its members and the estimation of the chance of the submitted papers to be published in relevant journals. This club was the

This paper is based on the text (in Serbian) by the same authors which will be published in *Nastava matematike*.

basis for organization of the *Yugoslav Mathematical Society* in 1937. Its membership was about 100 mathematicians, physicists and astronomers from universities of Belgrade, Zagreb and Ljubljana and its first president was *Tadija Pejović* from Belgrade University. Reports from the regular sessions were published in the annual publications of this Society. The Second World War interrupted all these activities.

Let us also add that, following the idea of advancing the level of the mathematical education, a number of distinguished Yugoslav mathematicians founded a special journal for the secondary school students, titled *Matematički list za srednju školu*, edited by *Radivoje Kašanin* and published in Belgrade only for two years, in 1931 and 1932.

The *Union of Mathematics Students* at the University of Belgrade was founded in 1926 and its activities covered a broad spectrum: formation of the professional library, publication of auxiliary textbooks, organization of professional meetings, collaboration with the corresponding organizations in Zagreb and Ljubljana, etc. The results of the UMSUB activities were quite impressive, including 26 publications and 8 issues of its journal *Matematički vesnik*, in the period 1935–1940.

2. Laying the foundations for the Society of Mathematicians and Physicists of Serbia

Being aware of the necessity to establish a scientific and professional society which would draw together all mathematicians and physicists, from universities, scientific institutes, schools, and other educational institutions, the Committee for Science and Culture of the Republic of Serbia approved the request for founding the *Society of Mathematicians and Physicists of Serbia*, in November 1947.


Tadija Pejović

The Founding Assembly of the Society was held in Belgrade on January 4th, 1948. In his report concerning goals and future initiatives of the Society, *Dobrivoje Mihajlović* emphasized the following points:

1. The Society will contribute to the promotion of both sciences, mathematics and physics, and help to popularize them.

2. The Society will encourage and support scientific research in these fields.

3. The Society will manage the issues of teaching mathematics and physics to primary and secondary school students, as well as at university level. To improve teaching methods, it will collaborate with other educational institutions.

As it was also stated, the Society would achieve its goals at annual meetings and other regular gatherings at which scientific, professional and pedagogical papers

would be presented. The Society would publish journals and other publications, and it would actively cooperate with other professional institutions in order to solve organizational issues in the field of mathematics and physics.

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At the Founding Assembly, the Bylaw of the Society was established and the president was elected, as well as members of the Managing Board and the Supervisory Board.

Professor *Tadija Pejović* was the first president of the Society of Mathematicians and Physicists of Serbia.

The first Managing Board consisted of: *Tadija Pejović*, university professor, *Sreten Šljivić*, university professor, *Ivan Bandić*, professor at High Pedagogical School, *Dobrivoje Mihajlović*, teacher at High Technical School, *Zarija Bulatović*, assistant at High Technical School, *Draga Nikolić*, university assistant, *Pavle Savić*, university professor, *Anton Bilimović*, university professor, *Miloš Radojčić*, university assistant professor, *Dragiša Ivanović*, assistant professor at High Technical School and *Petar Živojinović*, school inspector in the Ministry of Education.

After a while, the Society was renamed Society of Mathematicians, Physicists and Astronomers of Serbia. Due to the increased scope of activities, it was agreed that the Society should be divided into three separate bodies, and thus, the *Mathematical Society of Serbia* was formed in 1981.

3. The early days

The section primarily outlines the activities of the Society from its establishment to the end of 1952. Most of the basic aspects of its endeavours were introduced in this period.

3.1. After creating three sections, scientific, educational and promotional, at the Founding Assembly of the Society, it was decided that a scientific journal should be published. Thus, the first issue of *Vesnik Društva matematičara i fizičara NR Srbije* (*Bulletin of the Society of Mathematicians and Physicists of Serbia*) came out in 1949 and according to the plan made, it would appear four times a year. The well-known Serbian mathematician *Jovan Karamata* was its first editor-in-chief. Today, it is called *Matematički Vesnik* (*Mathematical Bulletin*).

Jovan Karamata

It is a journal guided by the international Editorial Board and it is included in the majority of the international data-bases of scientific journals.

3.2. During the first several years, the Society meetings were regularly held, always welcoming several scientific lectures each. The Scientific Section organized nine meetings in 1948, and presented 19 scientific reports.

At the first meeting, held on April 26th, 1948, *Anton Bilimović* and *Vlastimir Vučić* presented their papers.

Two particular meetings are worth mentioning here – the third meeting, held on June 10th, 1948, commemorated the fifth death anniversary of the famous Serbian mathematician *Mihailo Petrović*, and the ninth meeting, organised on December 24th, 1948, celebrated the 100th anniversary of the University of Belgrade.

The reports on all these meetings were regularly published in the Bulletin of the Society.

3.3. The branches of the Mathematical Society of Serbia are organizations maintained and managed by mathematicians residing in smaller country regions. The first branches were organized immediately after the establishment of the Society, back in 1948. These were the branches set up in the following towns: Belgrade, Niš, Novi Sad, Kragujevac, Šabac, Čačak, Požarevac, Užice, Leskovac, Jagodina, Valjevo, Sombor, Subotica and Zrenjanin.

Activities of the branches are heavily based on the enthusiasm of their members. There were periods when some of the branches were very active, but also those when some of them nearly ceased to exist. Let us mention the Valjevo Branch which was extremely active during a decade or two when it overtook the organization of summer and winter schools for young mathematicians coming from the entire territory of Serbia.

The major activities of the branches are the following:

- organising lower level competitions (county and regional);
- preparing and managing local seminars for teachers of mathematics and informatics;
- arranging additional programmes for talented young mathematicians, including local summer and winter schools;
- periodically organizing Republic (State) competitions.

Currently, the Society has 20 active branches. The branches from Belgrade and Niš, having more than 200 members, are the biggest. One of the major tasks of the Mathematical Society of Serbia is to improve the activities of its branches in the years to come.

3.4. The Initiative Committee, under the Serbian mathematicians' leadership, organised the *First Congress of Yugoslav Mathematicians and Physicists* held from 8th to 12th November, 1949 in Bled (Slovenia). About 350 mathematicians and physicists attended the Congress, among which, about 100 were from Serbia and 14 of them prepared to present scientific reports.

During the Congress, on November 12th, the Founding Assembly of the *Union of Mathematical and Physical Societies of Yugoslavia* (UMPSY) was held. The first

president of the Union was the well-known Serbian physicist *Pavle Savić*. *Katarina Kostić*, *Dobrivoje Mihajlović*, *Borivoj Rašajski* (as secretaries), *Vojislav Mihailović* (as treasurer), *Jovan Karamata* and *Vojin Dajović* were the other members of the Executive Board from Serbia.

3.5. In 1951, in an attempt to improve the teaching and learning of mathematics and physics, UMPSY decided to start publishing the journal *Nastava matematike i fizike u srednjoj školi* (*The teaching of mathematics and physics in secondary schools*). The publication was committed to the Society of Mathematicians and Physicists of Serbia. *Ivan Bandić*, *Vlastimir Stajić*, *Milica Ilić-Dajović*, *Đuro Kurepa* and *Miroslav Živković* were the editors of the journal in the period from 1952 to 1974.

3.6. Throughout that period, the Society worked intensively in order to help educational authorities in preparing modernized teaching programmes for mathematics (and physics).

4. Activities in the years that followed

4.1. The Congresses of Mathematicians and Physicists (later also astronomers) of Yugoslavia, followed by Serbian Mathematical Congresses, were held approximately every 5 years. The following congresses were organised:

1st Congress, Bled 1949. *2nd Congress*, Zagreb 1954. *3rd Congress*, Belgrade 1960. *4th Congress*, Sarajevo 1965. *5th Congress*, Ohrid 1970. *6th Congress*, Novi Sad 1975. *7th Congress*, Budva 1980. *8th Congress*, Priština 1985. *9th Congress*, Petrovac 1995. *10th Congress*, Beograd 2001. *11th Congress*, Petrovac 2004. *12th Congress*, Novi Sad 2008. *13th Congress*, Vrnjačka Banja 2014.

The 14th Serbian Mathematical Congress will be held in Kragujevac next year.

Since the 10th Congress (Belgrade 2001), young researchers have been awarded special prizes by Scientific Committees of Congresses. The following mathematicians were awarded so far: *Danko Jocić, Vladimir Dragović, Božidar Jovanović, Dragana Cvetković-Ilić*.

It should be particularly pointed out that during the 3rd Congress, the *International Symposium on Coordination of Mathematics and Physics Teaching* was held in Belgrade in 1960. Together with about country's 1800 mathematicians, physicists and astronomers, about 30 most eminent foreign scientists participated, including R. Courant, W. Sierpinski, M. H. Stone, G. Sansone, G. Choquet and others.

4.2. The following list contains the names of mathematicians and physicists from Serbia that held the position of president of the Union of the Societies of Mathematicians and Physicists of Yugoslavia during a certain period of time: *Pavle Savić* (1949–1954), *Sreten Šljivić* (1960–1965), *Dragiša Ivanović* (1975–1980), *Vojin Dajović* (1980–1985), *Đorđe Bek-Uzarov* (1985–1994), *Vladimir Mićić* (1994–2001), *Zoran Kadelburg* (2001–2004) and *Pavle Mladenović* (2004–2006).

4.3. The participation of Serbian mathematicians in international associations can be traced back to 1900 when *Mihailo Petrović* attended the 2nd International Congress of Mathematicians (ICM) in Paris. Later, he was the representative of Serbia in the *International Mathematical Union* (IMU) after its establishment in 1920. Our representatives participated actively in the work of the *Interbalkan Union* in 1934.


Mihailo Petrović

After the Society and the Union were set up, Yugoslav mathematicians renewed their participation in the IMU (they were among the representatives of 12 countries present at the General Assembly in Rome in 1952). *Đuro Kurepa*, *Bogoljub Stanković*, *Zoran Kadelburg*, *Pavle Mladenović*, *Siniša Vrećica* and *Mirjana Đorić* were, at different times, representatives from Serbia in the IMU.

When the *Balkan Mathematical Union* renewed its activities in 1966, *Đuro Kurepa* was our representative. He was elected president of the Union and held the position from 1977 to 1983, and in 1984, he became its co-president. We hosted the *5th Balkan Congress of Mathematicians* which was held in Belgrade in 1974. Later, the Balkan Mathematical Association ceased to exist, and a new organization was founded in 2002 under the name MASSEE (*Mathematical Society of Southeastern Europe*). *Zoran Kadelburg*, *Pavle Mladenović* and *Aleksandar Lipkovski* were our representatives in the association.

In 1976, the *Federation of Mathematical Societies of European Countries* was founded and *Bogoljub Stanković* represented us in the organisation. In 1990's the *European Mathematical Society* (EMS) was formed and sent a membership invitation to our Society. The invitation was accepted and *Stevan Pilipović* was appointed our representative in this new association. He was succeeded by *Zoran Kadelburg* and *Aleksandar Lipkovski*.

Since the Mathematical Society of Serbia is a reciprocity member of the American Mathematical Society (AMS), our mathematicians are at an advantage when obtaining literature and participating in international mathematical events.

As a delegate of Serbian mathematicians, *Mihailo Petrović* participated in the activities of the *International Commission on Mathematical Instruction* (ICMI), since its founding in 1908. The following list comprises the subsequent Yugoslav (Serbian) delegates at the ICMI: *Đuro Kurepa*, *Milica Ilić-Dajović*, *Milosav Marjanović*, *Zoran Kadelburg*, *Aleksandar Lipkovski* and *Đorđe Kadijević*. For a certain period of time, Đuro Kurepa was a vice-president of the ICMI. Serbian mathematicians were regular and active participants at all International Congresses on Mathematical Education.

4.4. *Đuro Kurepa* had a leading role among Serbian mathematicians and here his commitment to education will be briefly taken in consideration. Let us note

that in 1935, at the Sorbonne, he defended his doctoral thesis on set theory. This theory was his long term preoccupation which also influenced his views on mathematical education being an area to which he committed a part of his professional career. Here, we will single out only some of most relevant details.


Đuro Kurepa

As the representative of Yugoslavia, Đ. Kurepa attended the First IMU General Assembly (Rome, 1952), when he was nominated for ICMI vice-president, a position that he held for ten years. Let us quote a number of lines characteristic for his views on education. (Đ. Kurepa, 1959, Des principes de l'enseignment mathématique, L'Enseignment Mathématique, II, 5, 203 – 2012):

> "L'enseignment doit être actuel ... En particulier il faut mieux faire resortir les points de vue nouvaux et les applications que se perdre avec pêdantisme dans les finesses logiques de dêmonstration longues et complexes ... "
>
> "Nous nous trouvant devant une reforme radicale de l'enseignment des mathêmatiques. Plus prêcisêment ce sont les notions d'ensemble, de transformation et de structure qui doivent jouer un rôle actif dans l'enseignment."

Kurepa played a prominent part in the propagation of the New Math. He considered the concept of set to be basic at all levels of teaching and learning mathematics. But that its examples should vary from sensory level (collections of real objects in the surrounding space) going up to more and more abstract levels.

Professor Kurepa was a man of wide-ranging knowledge. We certainly do not remember him as a zealous reformer of teaching mathematics. In a publication issued after the mentioned International Symposium on the Coordination of the Instruction in Mathematics and Physics, Kurepa delivered a welcome speech and relating mathematics and physics, he said: " ... every phenomenon we encounter contains intrinsically something of mathematics and something of physics ... ". In that way he expresses his stance that experiencing of the real world is a source of knowledge in both of these two disciplines. His contributed paper in this publication is split into sixteen paragraphs, each having a very suggestive title: Particular and General, Nature as a Whole and Mathematics as its Language, The Fundamental Tetrad: Action – Perception – Intelligence – Imagination, etc. The reader can easily judge how large the ground of his considerations is.

At the end, we have to say that Professor Kurepa was a very attractive lecturer whose lectures were full of historical references and anecdotes. When proving theorems he would touch only main details and when finishing such his proof, he used to ask audience "have you seen why the theorem holds" and the audience would reply in one voice "yes, we have", (and only pedants thought it was a way of proving by acclamation).

4.5. The organisational scope of the Mathematical Society of Serbia is not

limited only to national congresses. The Society organised several international symposia, in some cases in cooperation with other institutions. The symposia were on:

- Differential and Partial Differential Equations (Belgrade, 1957);
- Numerical Solution of Differential Equations (Belgrade, 1960's);
- International Symposium on the Coordination of the Instruction in Mathematics and Physics (Belgrade, 1962);
- 5th Balkan Congress of Mathematicians (Belgrade, 1974);
- Topology and its Applications (5 Symposia – Herceg-Novi, 1968; Budva, 1972; Belgrade, 1977; Dubrovnik, 1985 and 1990);
- Complex Analysis and Applications (3 Symposia – Aranđelovac, 1984; Budva, 1986; Herceg-Novi, 1988);
- Mathematical Analysis and Its Applications (2 Symposia – Aranđelovac, 1997; Niška banja, 2002).

As it can be perceived, majority of the meetings were organized during the times of Cold War (before 1990), a period when contacts, even between scientists, were controlled and harshly limited. Since Yugoslavia (and Serbia within its borders) was a non-aligned country, we were able to invite colleagues from both sides of the "iron curtain" and thus initiate their creative, official and private meetings and further collaboration. One can recognize names of numerous significant mathematicians of the corresponding periods in the following shortened list of foreign participants: J. Aarts, L. Ahlfors, P. Ahern, L. Aizenberg, P.S. Aleksandrov, R. Anderson, T. Ando, M. Antonovskij, V.G. Boltjanskij, K. Borsuk, G. Choquet, R. Courant, A. Csaszar, E. Čirka, A. Duran, T. Frankel, P. Gauthier, V. Gavrilov, B. Gilligan, W. Hengartner, G. Henkin, E. Hille, Y. Komatzu, I. Korevaar, S. Miller, G. Omeljčanov, S. Owa, E. Reich, D. Rose, W. Rudin, S. Saitoh, G. Sansone, J. Siciak, W. Sierpinski, M.H. Stone, M. Vuorinen, V.A. Zorič.

Such a range of scientific activities within the frames of the Society was an outstanding contribution to constituting a number of "schools", embodying the topics of achievements in mathematics in Serbia. We would like to mention, for example, topology and set theory, real and complex analysis, distribution theory, etc.

Such range of scientific activities in the frames of the Society was a serious contribution to originating a number of "schools", characterizing the topics of mathematics achievements in Serbia. We mention, for example, topology and set theory, real and complex analysis, distribution theory, etc.

Let us list some members of the Mathematical Society of Serbia, thanks to whose enthusiasm and essential contribution the mentioned meetings and activities were successfully realized: *Vojin Dajović, Đuro Kurepa, Konstantin Orlov, Zlatko Mamuzić, Bogoljub Stanković, Milica Ilić-Dajović.*

4.6. The main scientific journal of the Society, *Matematički Vesnik* as it has been called since 1963, has already been published for nearly 70 years. All in all,

there are 209 issues – No. 4 of Volume 69 for 2017 included – containing more than 21 000 pages. Besides some other written material, 2520 scientific papers, contributed by national and international mathematicians were published. Both the quality of papers and the editing policy are constantly improving. The Editorial Board is now international, and includes several prominent mathematicians, as well as referees. The journal is included in and accepted by most of the important scientific data-bases, such as Emerging Sources Citation Index, Scopus, SJR SCImago, DOAJ, EBSCO, Mathematical Reviews, Zentralblatt f'ur Mathematik, Google Scholar.

The journal can be accessed at the address `www.vesnik.math.rs`, and it is also available through `www.emis.de/journals/MV` and `elib.mi.sanu.ac.rs/journals/mv`.

The following list contains the names of all editors-in-chief since 1949: *Jovan Karamata, Dragoljub Marković, Zlatko Mamuzić, Dušan Adnađević, Zoran Kadelburg, Mila Mršević, Ljubiša Kočinac* and *Neda Bokan*.

4.7. In 1974, *Nastava matematike*, initiated its independent "career" by releasing the new series. Its main topic was the issues of teaching and learning mathematics and computer sciences in primary school (grade 1–8), secondary schools (grade 9–12) and at universities. Selected topics are presented through the corresponding rubrics, contributed by competent national and foreign authors. Translations of some important papers, written by the leading mathematicians interested in the problems of teaching and learning mathematics, were included. Some of them are distinctive landmarks in the creation of corresponding curricula and realization of the proposed educational process. Since 1974, the editor-in-chief was *Milica Ilić-Dajović* and secretary of the Editorial Board was *Mirjana Mrmak*. Since 1991 Nastava matematike has been edited by *Milosav Marjanović* (editor-in-chief), *Vladimir Mićić* and *Zoran Kadelburg*.

A new journal called *The Teaching of Mathematics* was released in 1998. "The Teaching" is exclusively research-oriented. All contributed papers containing essentially new ideas and techniques relevant to teaching of mathematics at all levels, recommended by international referees, are considered for publication. In particular, papers containing subject analysis of selected teaching themas and new ways of their modelling are welcomed.

The journal is published twice a year and, up to now, the editorial position has been held by *Milosav Marjanović, Vladimir Mićić* and *Zoran Kadelburg*. The journal can be accessed at `www.teaching.math.rs`, and is also available through `elib.mi.sanu.ac.rs`.

4.8. From the very beginning, the Society has been making systematic efforts to improve teaching and learning of mathematics. In 1962, owing to *Vojin Dajović's* initiative and personal devotion, an official document of the state authorities was accepted, containing the explicit recommendation for "paying special attention to the educational aspect of mathematics and development of mathematical culture".


Vojin Dajović

This was a strong incentive to general affirmation of mathematics as the number of students entering universities in order to study mathematics was very small (only a few dozen) before the document mentioned above was accepted. Furthermore, the document initiated the introduction of all types of mathematical competitions, which were launched soon after. Finally, it made the establishment of a specialized Mathematical Grammar School in Belgrade possible.

4.9. Mathematical competitions started in Serbia in 1958 and they became an obligatory part of interaction with young mathematicians of all levels.

Nearly all teachers of mathematics are involved in some way, either by preparing their students for competitions, or taking part in the organization itself. The total number of pupils that take part in the competitions comes close to 100 000 a year. In the end, when all levels are finalised, the best 25 of them represent Serbia in international competitions.

The first "high school students' competition in solving mathematical problems" was organised by the Belgrade branch of the Society in 1958. The first Republic competition was organized next year, on April 26th, 1959.

The Society continued organising competitions every year and thus they became tradition. Hence, the 60th Republic (now it is called the State) competition will be organized next year. It will be preceded, as it is the custom, by county and regional competitions. These competitions are organised by local branches of the Society, but the problems are the same and they are prepared by the Central Republic Committee for competitions in secondary schools. Till 1977, Republic competitions were organized in Belgrade, but then they began to take place in various towns in Serbia which was a good way to make them more popular and often better organized.

The Republic (State) competition was not the final stage. Only a year after the first Republic competition, the first Federal competition was organised. The initiative was given by the Mathematical Society of Serbia and in the beginning, it was always organized in Belgrade. Later on, the other republics of Yugoslavia entered the organization as well. Serbian students usually won most of the prizes. One of the goals of the Federal competition was to select the best mathematicians for the team in international competitions. This selection is now made at the *Serbian Mathematical Olympiad*, the first being held in 2007.

4.10. The first *International Mathematical Olympiad* (IMO) was organized in Romania in 1959, i.e., in the same year when our first Republic competition took place. Our country joined the Olympic family in 1963, sending its eight-member team to the 5th IMO in Poland. For the first time, in 1967, we hosted the 9th IMO which was held in Cetinje. Our decision was to enlarge the Olympic family by

inviting certain countries from Western Europe (till then only Eastern European countries took part). Four of them accepted the invitation – the United Kingdom, France, Italy and Sweden, and so it was the beginning of the constant growth of the number of participating countries which nowadays exceeds 100. When we organized the Olympiad for the second time (in Belgrade, 1977), we were also the first to invite some non-European countries.

Our students won a lot of prizes (or medals, as they are now called) in the IMOs, and the vast majority of them were awarded to students from Serbia, even in the period when other Yugoslav republics also participated in the joined team. We won 15 gold medals in total, with *Teodor von Burg* receiving four of them, which resulted in his holding the first position in the Hall of Fame of IMO for several years.

Teodor von Burg

Since 1987, Yugoslav (later Serbian) teams have participated regularly in the *Balkan Mathematical Olympiads* (BMO). Serbia hosted the BMO three times: in 1994, the 11th BMO was organized in Novi Sad, in 2001, the 18th BMO took place in Belgrade, and in 2009, the 26th BMO was organized in Kragujevac. Our students won 34 gold medals in these competitions.

The next, 35th Balkan Mathematical Olympiad will take place in Belgrade in May 2018.

Finally, the *European Girls Mathematical Olympiad* (EGMO) has been organized since 2012. Our girls have regularly participated in them from the very beginning and already won 6 gold medals.

4.11. Following the pattern of secondary school competitions, the Mathematical Society of Serbia initiated primary school competitions in mathematics during the 1960's. In the beginning, only lower level competitions (school, county, regional) were organized, but on June 4th, 1967, the first Republic competition was held in Belgrade. Nowadays the Republic competition (or State, as it is now called) is an event in which about 300 pupils take part and which takes place in a different town in Serbia every year. It is very hard to qualify for this event, since several tens of thousands of young mathematicians try to achieve this goal.

The first Federal competition was organized in Belgrade in 1970, where 28 best young mathematicians, 8th graders, from 5 republics participated. Later on, the 7th and 6th graders joined and the competition was organized in various towns all over Yugoslavia. Now, it is replaced by the *Junior Serbian Mathematical Olympiad* (JSMO) which inherited one of the main goals of the Federal competitions – to elect the team for the *Junior Balkan Mathematical Olympiad* (JBMO).

The Mathematical Society of Serbia initiated the organisation of the JBMOs – mathematical competitions for best young mathematicians from Balkan countries

of the age 15.5 or less. The first Olympiad was organized in Belgrade in 1997, which welcomed 5 countries. Nowadays, it is a competition in which all 11 Balkan countries regularly participate. Moreover, the guests from non-Balkan countries are frequently invited. Our country hosted the competition twice following the initial one – the 8th JBMO was held in Novi Sad in 2004 and the 19th JBMO in Belgrade in 2015.

4.12. In 1980, a group of Australian mathematicians started organizing a game-contest in the form of a multiple-choice test, intended to popularise and promote mathematics among the youth. Since the contest was a great success, French mathematicians, paying tribute to the Australian colleagues, made a similar contest and started organising it in 1991 under the name *Kangourou Sans Frontières* ("Kangaroo Without Frontiers"). In the subsequent years other (mostly European) countries joined this organization. Nowadays, on the third Thursday in March every year, more than 6 million students (!), age 8 to 18, from over 40 countries, are trying to solve relatively easy, but definitely challenging mathematical problems.

Serbia joined the "Kangaroo"-family in 2005 owing to the work of Subotica branch of our Society. In the first two years, mostly pupils from Vojvodina took part, but in 2007 the whole Society began to be involved and the number of competitors rose to more than 35 000. We are sure that in subsequent years this growth will continue.

4.13. Competitions in informatics for high-school pupils have been organized by the Serbian Mathematical Society since 1988 and initiated by *Arif Zolić*, the president of the Society at the time. Although informatics and computing are very wide areas that include various aspects of computer application, competitions in informatics have a very clear scope and from the beginning pupils have been competing in algorithm design and implementation, i.e., in programming. Competitions are organized at various levels: municipal competitions have recently been replaced by on-line qualifications; they are followed by county and state-level competitions, and the final stage is the *Serbian Olympiad in Informatics* (SIO). Pupils are divided into groups according to their age, but, more important, according to the school that they are attending (pupils from ordinary and specialized schools are directly competing one against another only at SIO). Based on the SIO results, a team of 4 pupils is selected to represent Serbia at international competitions – two most important are *Balkan Olympiad in Informatics* (BOI) and *International Olympiad in Informatics* (IOI). Our pupils have been competing at IOI since 1989, under three different flags (Yugoslavia, Serbia and Montenegro, and Serbia). Until 2017, three gold medals have been won.

Simultaneously with the competitions for high-school pupils, competitions for primary school pupils also started in 1988. Pupils compete at municipal, county, and state-level competitions to qualify for the *Junior Serbian Olympiad in Informatics* (JSIO). At the initial levels, pupils compete in groups formed solely based on their age, but at JSIO all pupils solve the same set of problems. Best four pupils make our junior team for the international competitions – *Junior Balkan Olympiad*

in Informatics (JBOI) and, since 2017, *European Junior Olympiad in Informatics* (EJOI). International JBOI competitions were initiated by the Mathematical Society of Serbia, and the first competition was organized in Belgrade in 2007. Among notable accomplishments of our young competitors at JBOI, we will only mention two gold medals.

Serbia was the host of the following international competitions in informatics: 10th BOI, Belgrade 2002, 1st JBOI, Belgrade 2007, 20th BOI, Belgrade 2012, and 8th JBOI, Belgrade 2014.

Committees that organize competitions for pupils are constantly trying to improve the competition system and to make modern, popular competitions that would attract many pupils. A constant problem was that until 2017/18, programming was not part of obligatory curricula in primary schools and in ordinary high schools it has not been taught as extensively as in specialized high schools. Therefore, it is quite understandable that pupils from specialized schools have shown keener interest for competitions and have achieved better results. Introducing informatics, algorithmic thinking and programming into obligatory curriculum for all pupils opens possibilities for further popularization of these areas among the young.

4.14. The work with young mathematicians begins in their schools. But a lot of them can and need more than they obtain in this way. Some (unfortunately, not all) branches of our Society organize various types of mathematical preparations, mostly (but not exclusively) devoted to future competitions. Almost every year, the Society itself organizes special preparations prior the Republic and/or Federal competition (for primary or secondary level or both). Of course, teams for international competitions deserve and get special treatment.

But there are other types of mathematical activities, organized occasionally by the Society or some of its branches which are not exclusively competition-oriented, and these are summer and winter schools. They are usually organized in a certain summer or winter resort and, besides mathematical programs, other (social, sport, entertainment, ...) activities are also in the scope of interest.

The first summer school for young mathematicians from primary schools was organized from 1st to 8th August, 1975 in the "Šuplja stena" resort (near Belgrade). Since young mathematicians were very satisfied with this school, it lasted for 12 years – up to 1986. A lot of high school teachers and university professors took part and delivered lectures. Some other summer schools were organized in the same time or after "Šuplja stena". Some of them included lectures in informatics as well.

Winter schools were organized by various branches of the Society. One that has to be mentioned in particular is the winter school in the Divčibare resort which was regularly organized (with rare exceptions) by the Valjevo branch of our Society from 1981 to 1997. Although officially regional, it was actually a Republic school, for which both students and lecturers were carefully chosen all over Serbia. Boundless energy and great will of *Vojislav Andrić* made the organisation of these schools possible. During the same period, the Valjevo branch organized several summer schools, too. We should also mention three thematic schools of great quality held in

Tršić from 1994 to 1996. Four summer schools were organized by the Society on the mountain of Goč from 2010–2013. At the moment, starting from 2014, summer and winter school are, again, organized by the Valjevo branch on behalf of the Society.

4.15. In the mid-1960's, the Union of Mathematicians, Physicists and Astronomers of Yugoslavia decided that a journal for young mathematicians from primary schools ought to be published and that Mathematical Society of Serbia would be its publisher. The idea was realized in 1967 when the first issue of *Matematički list za učenike osnovnih škola* ("Mathematical Newsletter for Primary Schools") appeared. In subsequent years it became the basic mathematical literature for pupils of the age 10–15 (4th to 8th graders), in the whole Yugoslavia, published in about 80 000 copies. "Matematički list" also initiated the Federal competition of young mathematicians from primary schools and for some years was its basic sponsor. Now, it is still the most popular school journal and after more than 50 years it can be said that hundreds of thousands of former students can remember that in their school days they read it and tried to solve problems in it.

By the end of 2016, a significant jubilee was celebrated – the 50th anniversary of "Matematički list". It was marked by a series of quiz-competitions, with the final one held in Belgrade. It is planned to be organized again in the years to come.

4.16. As a response to the proposal of the Union of Mathematicians, Physicists and Astronomers of Yugoslavia, the journal intended for young mathematicians (and physicists) from secondary schools, has been published by the Croatian Society since 1950. Hence, the need for such a journal arose in Serbia at the beginning of the 1990's. The first issue of *Tangenta* ("Tangent"), a journal on mathematics and informatics, intended for secondary schools, appeared in 1995. In the first years, it was prepared by the Novi Sad branch of our Society, and later transferred to Kragujevac. Since 2016, it has again been published in Novi Sad.

4.17. The work with young mathematicians would be impossible without the basic literature. This simple fact was very early recognized in the Mathematical Society of Serbia, and it was *Milica Ilić-Dajović* who in the early 1960's, gave an initiative to start a special series of books designed for the young. It was agreed that its name would be *Materijali za mlade matematičare* ("Materials for young mathematicians") and the first issue was published in 1964. In the beginning, the issues of this edition were short collections of mathematical problems, but later on, more serious books were published, including textbooks treating basic areas of mathematics intended for those that prepare themselves for mathematical competitions. Also, collections of problems from national and international Olympiads are regularly published.

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There is no doubt that this collection of books played a very important role in raising the level of mathematical knowledge among young mathematicians, both from primary and secondary schools, as well as among their teachers. The number of the last issue of the series published in 2017 is 55, but a lot of them had several editions (up to nine). The editors of this collection in the past 54 years were: *Milica Ilić-Dajović, Vladimir Mićić, Vladimir Janković* and *Zoran Kadelburg*.

4.18. The Mathematical Society and its members were active in various educational institutions trying to improve the position of mathematics and teaching of mathematics. The Society (and *Vojin Dajović* in particular) made a decisive impact to founding the Mathematical Grammar School in Belgrade in 1966. The school became the best one in Serbia, being the biggest source of future mathematicians, physicists and engineers. Also, the majority of members for Yugoslav (later Serbian) Olympic teams (both senior and junior) come from this school. Since 2004, specialized primary school classes are included (for 14–15 year old pupils) which further improved its quality. Moreover, specialized classes were organized in several towns in Serbia, and they comply with the program of the Mathematical Grammar School (both primary and secondary).

4.19. Among the most important activities of the Mathematical Society of Serbia is managing the issue of improving the educational process in its entirety, especially the issues of improvement of teaching and learning mathematics at all levels. Besides publishing journals dedicated to these topics, there is a tradition (starting from the 1960's) of organizing "State Seminars on Mathematics (and Computer Science) Instruction". Their programs consist of a few plenary lectures, several special workshops and a number of master classes. In recent years, while the process of systematic licensing of teachers inside the educational system has been on, the character of these seminars has been, in some way, formalized. Thus, their role in the process of professional advancement of mathematics and informatics teachers has been significantly improved. They are supplemented by some regional seminars of similar character. The permanent increase of the number of master classes in informatics is evident.

4.20. The rapid development of computing and informatics in the recent decades was accompanied by many activities of the Mathematical Society of Serbia. Since 2000, the Seminar designed for teachers' vocational training and professional development usually includes from three to eight lectures on teaching of informatics. The lectures can be classified into several areas: methods of teaching informatics, methods of teaching programming, modern computer technology, and computer application in teaching of mathematics. Trainers are usually professors and assistants from the faculties that cover teaching of informatics. Often the best teachers from primary and high-schools, and recently, representatives of IT industry, which is a growing and becoming a very important economic field in Serbia, are included in the realization of these seminars. Apart from the technical and pedagogical aspects, it is clear that communication between all included parties

and sharing their experiences and ideas from the classrooms lend these seminars a very special quality and contribute to the improvement of teaching methodology.

Members of the Mathematical Society of Serbia always have a significant role in all aspects of teaching of informatics in primary and high schools (propounding curricula, creating teaching materials, proposing innovations etc.).

Scientific and professional journals have started publishing articles in the field of informatics while computer scientists are included in their editorial boards. Following this pattern in setting the internal organizational structure of the Society – Executive and Managing boards include professionals working in computer science.

4.21. In the process of modernizing its activities, the Mathematical Society of Serbia has set up its site

`www.dms.rs`

All relevant information about the activities of the Society can easily be found on this site. Most of the journals that the Society publishes have their own sites.

4.22. In the end, we present the list of all presidents of the Society, since it was founded in 1948:

Tadija Pejović (1948–1952), *Dragoljub Marković* (1953–1957), *Sreten Šljivić* (1958–1962), *Milica Ilić-Dajović* (1963–1967 and 1972–1973), *Zlatko Mamuzić* (1968–1969), *Đorđe Karapandžić* (1970–1971 and 1974–1975), *Vojin Dajović* (1976–1980 and 1984), *Dušan Adnađević* (1981), *Miroljub Jevtić* (1982), *Milorad Zimonjić* (1983), *Vladimir Mićić* (1985 and 1989–1990), *Arif Zolić* (1986–1988), *Zoran Kadelburg* (1991–1994, 1999–2000 and 2010–2011), *Pavle Mladenović* (1995–1998), *Rade Doroslovački* (2001–2004), *Branislav Popović* (2005–2009), *Aleksandar Lipkovski* (2012–2015), *Vojislav Andrić* (2016–).

It should be mentioned that the Society has also elected honourable members. At the moment, they are: *Vladimir Mićić, Milosav Marjanović, Ratko Tošić, Arif Zolić* and *Radoslav Dimitrijević*.

Acknowledgement. We are grateful to Professors Vladimir Mićić and Branislav Popović for giving us permission to use some parts of the paper cited as [4] in this text. We especially appreciate Professor Milosav Marjanović's contribution in writing Subsection 4.4 about Đ. Kurepa.

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