

Abstract Proceedings

INTERNATIONAL SEMINAR ON MATHEMATICS AND NATURAL SCIENCES

organized by

**SAMARKAND STATE UNIVERSITY
AND
MALAYSIAN MATHEMATICAL SCIENCES SOCIETY**

EDITORS:

Maslina Darus

President

MALAYSIAN MATHEMATICAL SCIENCES SOCIETY

c/o School of Mathematical Sciences

Faculty of Science & Technology

Universiti Kebangsaan Malaysia

E-mail: maslina@ukm.my

Zainidin Eshkuvatov¹, Zahriddin Muminov²

c/o ¹Department of Mathematics, Faculty of Science, Universiti Putra Malaysia

E-mail: ¹ezainidin@gmail.com, ²zimuminov@gmail.com

Ahmadjon Soleev¹, Saidakhmad Lakaev²

c/o Samarkand State University, Samarkand, Uzbekistan

The representative from Uzbekistan

E-mail: ¹asoleev@yandex.ru, ²slakaev@mail.ru

Forewords



Dear colleagues,

It is a great pleasure and privilege for me to welcome all participants of the International Seminar on Mathematics and Natural Sciences (ISMNS2013) organised by the Samarkand State University and the Malaysian Mathematical Sciences Society (PERSAMA).

This is indeed a meaningful event for PERSAMA since it is not our first kind of collaboration. It has been around since 2011 when we had our first Joint Meeting together with the International Training and Seminars on Mathematics (ITSM2011).

It is hoped that this meeting shall pursue further collaboration among the scientists from Malaysia and Uzbekistan. PERSAMA is always willing to facilitate this matter.

Finally, PERSAMA would like to thank Samarkand State University for hosting this meeting and also to all committee members who have worked so hard to make this meeting a success. We wish everyone an enjoyable and fruitful meeting.

Thank you all.

Best Regards,

A handwritten signature in black ink, appearing to read 'Maslina Darus'. The signature is stylized and cursive, with a long horizontal line extending from the end.

Maslina Darus
President
Malaysian Mathematical Sciences Society (PERSAMA)

Forewords



Dear colleagues,

It is a great pleasure for me to welcome all participants in this seminar, which is organized at Samarkand State University in cooperation with Malaysian mathematical sciences society, National University of Malaysia and University Putra Malaysia. This international seminar-training is the result of tight contacts of Uzbek and Malaysian specialists on mathematics.

The main aim of this International Training-seminar is to bring together specialists, researchers and students working on various aspects of mathematics and natural sciences to discuss the scientific results of their investigations and further development the interactions among these researches in these fields of subjects.

Samarkand is one of the oldest inhabited cities in the world, prospering from its location on the trade route between China and the Mediterranean (Silk Road). UNESCO included the city to its World Heritage list as Samarkand is situated on Crossroads of Cultures. In the Middle centuries the first astronomical observatory was built by grandson of Amir Timur- Ulugbek, which went down to history as the "scientist on throne", the patron of science and enlightenment. Being the greatest astronomer he compiled star tables "Zidji Gurgani" with his collaborators and pupils, which contains the exact positions of more than thousand stars. The list preserved their scientific significance till nowadays. Besides, Mirzo Ulug'bek was a founder of the first university in Central Asia, in 1420 he built Madrasah- Oliy on Registan Square, which became famous in the world as "the academy of Ulugbek".

It is my pleasure to welcome you all to this seminar and it is especially great pleasure for us the delegation is headed by president of Malaysian National Council of Women's Organization (NCWO), Vice chancellor National University of Malaysia, one of well-known scientists in medicine and biology and also outstanding organizer in Science and education Prof. Tan Sri Dato Seri Dr. Sharifah Hapsah Syed Hasan Shahabudin.

One of the purpose of the seminar is to seek avenues for networking and research collaboration among Malaysian scientists and the local counterparts in Uzbekistan.

This is indeed a meaningful event for Samarkand State University as this is the second time that the University is receiving the participants of the seminar from Malaysia.

Finally, Samarkand State University would like to thank to Malaysian Mathematical sciences society, National university of Malaysia, University Putra Malaysia and also to all committee members, who worked so hard to make this meeting successful. We wish everyone an enjoyable and fruitful meeting.

Thank you all.

Best Regards, Rector of Samarkand State University Prof. Dr. U. Tashkenbaev

Dedicated to Prof.Dr. Saidakhmat Norjigitovich Lakaev on his 60th Birthday



**Professor of the Department
*Mathematical-Physics and Functional
Analysis of the Samarkand State
University named A. Navoi.***

Curriculum Vitae

1952: Born March 9, in Poyariq province, Samarkand region of Republic of Uzbekiston(former USSR).

1959-1968: Studied at school Number 44.

1968-1973: Studied in Samarkand State University.

1973-1975: Trainee-researcher at Moscow State University.

1975-1978: Postgraduate Studies (Ph. D. Candidate of sciences) at Moscow State University.

1989-1991: Postdoctoral research (postdoc) in Moscow State University.

1981: Obtained the degree Candidate of Sciences (Ph.D.) in Physics and Mathematics, in Moscow State University (Moscow, USSR)

1992: Obtained the degree doctor of Sciences (in Physics and Mathematics) at Sankt-Petersburg State University (Sankt-Petersburg, Russia).

1978 -1992: Has been working as an assistant, docent (associate Professor) at Samarkand State University.

1993: Obtained the academic title of “Professor”.

1987-1997 and 2003-2013: Head of Departments *Functional analysis* and *Mathematical-Physics*.

1993-2012: Chair of department of “Mathematics”, Samarkand Branch of the Academy of Sciences the Uzbekistan.

1993-2012: Leader of 4 scientific research grants of Fundamental Research Foundation of Uzbekistan and of 3 research grants, financed by Fundamental Research Fund of Academy of Sciences of Uzbekistan,

S. Lakaev is an author of more than 130 scientific publications (more than 50 of them was published in recognized international science journals).

He is a prolific scientist, who created his own scientific school in Uzbekistan: Trained one doctor of sciences: J. Abdullaev(2001); 14 Candidate of sciences: J . Abdullaev(1992) A.

Chulfa(1997) M. Muminov(1992) A. Xolxojaev(2001) , Sh. Hudoyazarova (2001) , I.Khayrullaev (2002), S. Samatov (2004) , U. Soatov(2004), T. Rasulov(2005), Z. Muminov(2008), I. Bozarov (2008), G.Yodgorov (2009), Sh. Kholmatov (2012).

S.Lakaev is a first leader of scientific research of : Prof. Dr. I. Ikromov, Dr. S. Imomkulov, Dr. Sh. Kasimov and Candidate of sciences: Sh. Mamatov , M. Shermatov, R. Shamsiev, N. Toshboev, N.Khudoyazarov .

Leader of Postdoctoral researchers (postdocs) of the Candidate of sciences: M.Muminov , A.Kholhojaev, Z.Muminov, I. Bozorov, Sh.Latipov, S. Ulashov, Sh. Kurbanov, S. Dostov.

Pupils of Lakaev have been won high levels in international, local science-olympiads, different contents. For example: I. Ikromov (1982) , N.Khudoyazarov (1988) are winners of International Olympiads among students: S. Djangryan (1981) J.Abdullaev and S. Imomkulov (1983-1985), Sh.Kholmatov (2006-2008), Sh. Alladostov (2011-2012) are winners of Republic Olympiads;

1993: winner of the International SAROS Fund grant, he had been member of Science Academy of New York (1994), member of the American Mathematical Society and Mathematical reviews (USA) (in 1996-2000).

1996 and 2000: winner of DAAD grant (Germany) .

2000-2011: Head the German scientific projects DFG 436 UZB113/3, DFG 436 UZB 113-4, DFG436 UZB 113-6, DFG436 UZB 113-7.

During 1996-2010, Prof. Lakaev together with his pupils made scientific researches with professors Sergio Albeverio (Bonn University), Volker Bach and Walter Pedra (Mainz University) on the base of scientific projects DAAD and DFG Germany.

2009: Winner of Grant of Max Planck Graduate Center (MPGC).

2012: Visiting professor of Technology Universities of Mara and Malaysia and also National University of Malaysia, University Putra Malaysia.

03.09.2013-03.07.2014: Grant holder of William Fulbright Visiting Scholar Program, University of California Davis.

Courses taught: 1978 to present: Mathematical analysis, Functional analysis, Theory of functions of complex variable), Real analysis , Spectral theory of self-adjoint operators, Schrödinger operators on lattices, Spectral properties of the Friedrichs's model.

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Automata Diagram for Finite Groups

Fong Wan Heng^a, Gan Yee Siang^b, Nor Haniza Sarmin^c & Sherzod Turaev^d

^a *IbnuSina Institute for Fundamental Science Studies, Universiti Teknologi Malaysia (UTM),
Johor Bahru, Johor, Malaysia*

^{b, c} *Department of Mathematical Sciences, Faculty of Science, UTM, Malaysia,*

^d *Department of Computer Science, Kulliyah of Information and Communication Technology,
International Islamic University Malaysia, Kuala Lumpur, Malaysia*

Email: fwh@ibnusina.utm.my, ysgn88@gmail.com, nhs@utm.my, sturaev@gmail.com

ABSTRACT

Recently, automata have been related to group theory by using some modification devices. These modification devices are namely modified deterministic finite automata and modified Watson-Crick finite automata. The automata can be linked to group theory when some automaton diagrams are drawn to recognize the data given in the Cayley table for the groups. Thus, the properties of groups can also be analyzed from the automaton diagrams. In this paper, the formal definitions for modified finite automata and modified Watson-Crick finite automata over general case of finite groups are given. In addition, theorems are presented for the determination of a group by using the automaton diagram, and for the recognition of automata devices for groups. Lastly, the properties of centralizer of a group resulting from the analysis of automaton diagrams are also presented.

Keyword: Automata, Group, Watson-Crick, Centralizer

A Pursuit Differential Game of Many Pursuers and One Evader with Coordinate-Wise Integral Constraints on Controls of Players

¹Gafurjan Ibragimov, ¹Idham Arif Alias, ²Atamurat Kuchkarov

¹ *Institute for Mathematical Research & Department of Mathematics, Universiti Putra Malaysia,
43400, Serdang, Selangor, Malaysia.*

² *Institute of Mathematics at the National University of Uzbekistan, 29, Dorman yuli str., 100125,
Tashkent, Uzbekistan*

Aim: In this paper, a simple motion pursuit differential game of several pursuers and one evader is studied in \mathbb{R}^2 . Control functions of all players are subjected to coordinate-wise integral constraints. We say that pursuit can be completed if the state of a pursuer coincides with that of the evader at some time. The problem is to obtain sufficient conditions on energy of players for completion of the differential game and construct strategies for pursuers based on the current values of control parameter of the evader.

Methodology: Admissible control of the i th pursuer and the evader are defined as the measurable functions $u_i(t) = (u_{i1}(t), u_{i2}(t))$ and $v(t) = (v_1(t), v_2(t))$, $t \geq 0$, satisfying the

following conditions $\int_0^\infty |u_{ij}(s)|^2 ds \leq \rho_{ij}^2$ and $\int_0^\infty |v_j(s)|^2 ds \leq \sigma_j^2$, respectively, where ρ_{ij} ,

$i = 1, \dots, m$; σ_j , $j = 1, 2$, are given positive numbers. To complete the differential game we construct strategies for the pursuers and they apply the strategies successively. The important property of the strategies we use in the paper is that the pursuers force the evader to spend all its energy.