

israeli-polish mathematical meeting łódź 2011

sections overview



Israel
Mathematical
Union האגוד הישראלית
למתמטיקה

Polish Mathematical Society
Israel Mathematical Union
University of Łódź
Technical University of Łódź

Israeli-Polish Mathematical Meeting, is a joint initiative of the Polish Mathematical Society (PTM) and the Israel Mathematical Union (IMU). Mathematicians from other countries are also cordially invited to participate.

The meeting will be hosted by the Faculty of Mathematics and Computer Science, University of Łódź (UŁ). Its program will cover many topics pertaining to mathematical research conducted in Israel and Poland. The Meeting will consist of plenary lectures, thematic sections and other informal scientific discussions and social activities as well.

The Meeting will start in the morning of Monday September 12, 2011 and end in the afternoon of Thursday September 15, 2011.

We are pleased to present the list of thematic sections planned for Israeli-Polish Mathematical Meeting. Short descriptions also contain the names of the organizers and a link to an e-mail address of the person responsible for the section.

If somebody would like to present a talk on the thematic section part of the Meeting, he should register on the [webpage](#) of the Meeting and submit an abstract. The registration and abstract submission will be opened in the beginning of 2011.

Organizers

1. ALGEBRAIC DIFFERENTIAL EQUATIONS AND FOLIATIONS

Autonomous differential systems $\dot{x}_1 = P_1(x), \dots, \dot{x}_n = P_n(x)$ with polynomial right hand sides can be naturally considered as complex vector fields with complex time. Any such vector field defines a foliation with Riemann surfaces as leaves. This foliation is extended to a singular foliation of the projective space $\mathbb{C}P^n$. There exist relations of the theory of such foliations with many classical topics of the Ordinary Differential Equations Theory: the problem of integration in finite terms (Differential Galois Theory), the Poincaré center problem and its generalizations, the Riemann–Hilbert problem and its generalizations, the 16th Hilbert problem (about the number of limit cycles of a real plane vector field). The theory of complex foliations provides a modern approach to these problems.

organizers: S. Yakovenko, H. Żołądek
for more information contact: [Henryk Żołądek](#)

2. APPROXIMATION AND COMPLEXITY

Approximation theory is concerned with the ability to approximate functions and processes by simpler and more easily calculated objects. It is the study of how to approximate, how good the approximation is, and how good the approximation can possibly be.

Complexity is concerned with optimal ways of approximation. Using n simpler objects, we study the minimal errors and we want to know the best speed of convergence as n tends to infinity. For functions of d variables we also want to know the dependence on d .

The section "Approximation and Complexity" will cover recent progress in both fields. We expect to have more 10–20 talks on these subjects.

organizers: A. Pinkus, H. Woźniakowski
for more information contact: [Henryk Woźniakowski](#)

3. ARITHMETIC ALGEBRAIC GEOMETRY

To be announced.

With financial support of University of Szczecin and Adam Mickiewicz University in Poznań.

organizers: G. Banaszak, W. Gajda, P. Krasoń, E. de Shalit
for more information contact: [Grzegorz Banaszak](#)

4. COMBINATORICS

To be announced.

organizers: T. Łuczak, M. Krivelevich
for more information contact: [Tomasz Łuczak](#)

5. COMMON TRENDS IN MATHEMATICS EDUCATION RESEARCH IN POLAND AND ISRAEL

Within the area of mathematics education more and more discernable are disjoint research fields. Examples like "Algebraic (geometrical, stochastic...) thinking", "Language and Communications", "Argumentation and proof", "Early Years Mathematics" show their differentiation which require both the application of specific research methods and referring to the adequate theoretical background. This phenomenon could have been noticed in the structure of consecutive CERME conferences where researchers concentrate around selected problem areas. Then the need has emerged for a synthesizing reflection on mathematics education as one discipline. The Israeli-Polish Mathematical Meeting, giving an opportunity of presenting research fields exploited in the two countries, may also contribute for such a synthesizing reflection.

organizers: E. Swoboda, D. Tirosh

for more information contact: [Ewa Swoboda](#)

6. COMPLEX ANALYSIS AND PDES

The session will concentrate on various PDE techniques related to complex analysis in one and several variables.

organizers: Z. Błocki, S. Zelditch

for more information contact: [Zbigniew Błocki](#)

7. CAST WORKSHOP CONTACT AND SYMPLECTIC TOPOLOGY

During this workshop, a wide variety of subjects which play a central role in contact and symplectic topology will be discussed. This includes:

- Fukaya category and Mirror Symmetry
- Floer homology
- symplectic Field Theory
- topology of contact and symplectic manifolds
- groups of symplectomorphisms and contactomorphisms

The workshop is planned as a meeting of leading experts in symplectic and contact topology, including many CAST members, with a focus on open problems.

organizers: M. Entov, A. Tralle

for more information contact: [Aleksy Tralle](#)

section website: [CAST workshop "Contact and Symplectic Topology"](#)

8. CONTEMPORARY GEOMETRY

The section "Contemporary Geometry" is intended for mathematicians working in geometry, broadly understood – including differential, symplectic, and classical geometry.

organizers: V. Rovenski, P. Walczak, R. Wolak
for more information contact: [Vladimir Rovenski](#)

9. ERGODIC THEORY AND DYNAMICAL SYSTEMS

This section gives the opportunity for talks on Dynamics, including the fields of ergodic theory, topological dynamics, symbolic dynamics, hyperbolic dynamics, low dimensional dynamics (real and complex), and applications of these fields to probability, number theory, and geometry.

organizers: J. Aaronson, K. Frączek, M. Lemańczyk, O. Sarig
for more information contact: [Mariusz Lemańczyk](#)

10. FUNCTIONAL DIFFERENTIAL EQUATIONS

The topics include equations and inequalities with functional dependence (delays, deviations, integrals), finite difference schemes, methods of lines, differential difference and differential algebraic equations, qualitative properties of functional differential equations, dynamical systems, boundary value problems, free boundary value problems, nonlocal effects in hydrodynamics and practical methods of their approximation, nonlocal models of mathematical biology, financial mathematics and other diffusion processes.

organizers: W. Czernous, A. Domoshnitsky, H. Leszczyński, E. Litsyn
for more information contact: [Henryk Leszczyński](#)

11. GAMES AND FINANCIAL MATHEMATICS

The mathematical modeling of economic systems in stochastic environment leads to various mathematical optimization and game theory problems. If the decision problem consists in choice of intervention moment one can formulate the model of such case as the optimal stopping problem. If it is allowed to react more than once the approach depends on the number of decision makers and their aims. If there is one decision maker and two reactions (or fix number of possible moment of actions) we have the optimal two stopping (multiple stopping) problem. When there are two decision makers with their prescribed aims we usually treat the problem as the stopping game.

The extension of noncooperative games to the case when the communication between player is allowed leads to various solutions concepts. The extensions of the stopping game introduced by Dynkin (E.B. Dynkin, *Game variant of a problem on optimal stopping*, Soviet Math. Dokl., 10; 270 – 274, 1969) and their applications are

included to the programme of the session. The seminal paper by Kifer (Yu. I. Kifer., *Game options*, Finance Stoch., 4(4); 443–463, 2000) has opened the research on the game options. The problem of superreplication for game options under proportional transaction costs is also the subject of investigation.

The other topics on which we focus our attention are stochastic games and stopping game models related to a multivariate renewal process when only some events are observed. The concept of correlated equilibria in such games is also worth to study.

One of the goals of this session is to gather people working on the model to discuss recent advances.

Prospective speakers:

Łukasz Balbus, Institute of Mathematics and Computer Sci., WU of Technology, Wrocław
 Y. Dolinsky, ETH Zürich, Switzerland
 F.Ferenstein, Warsaw University of Technology
 A. Jaśkiewicz, Institute of Mathematics and Computer Sci., WU of Technology, Wrocław
 Yu.I. Kifer, Hebrew University of Jerusalem
 R. Muraviev, ETH Zürich, Switzerland
 K. Szajowski, Institute of Mathematics and Computer Sci., WU of Technology, Wrocław

The session is proposed to include the following presentations with tentative titles:

Yan Dolinsky, *Hedging of game options with the presence of transaction costs*
 Łukasz Balbus, *Construction of Nash Equilibria in Stochastic Games with Convex Transition Probability*
 R. Muraviev, *Learning, Diverse Beliefs and Long Run Issues in Heterogeneous Equilibrium*
 K. Szajowski, *On risk stopping games under partial information*

organizers: Y. Kifer, K. Szajowski

for more information contact: [Krzysztof Szajowski](mailto:Krzysztof.Szajowski@im.uz.edu.pl)

12. GEOMETRIC FUNCTION THEORY

The topic includes theory of holomorphic mappings in one and several complex variables, harmonic and pluriharmonic functions, quasiconformal mappings, entire and meromorphic functions, general theory of univalent and multivalent functions with their various applications.

The purpose of the section is to joint efforts of scientists from our both countries, to deepen the further cooperation of specialists working on fields of complex analysis in one and several variables.

The program of the section will concentrate around presentations of recent important advances and future trends by leading researchers. It will provide a venue for both Polish and Israeli analysts to interact with one another.

We will aspire to attract distinguished researchers of high level, to exchange of ideas and to formulate new open problems.

organizers: M. Elin, S. Kanas

for more information contact: [Stanisława Kanas](#)

13.

14. GEOMETRIC TOPOLOGY

Geometric Topology evolved from the work carried on in various countries, and the list of its creators include such names as Antoine (France), Alexander, Moore, Bing, Moise (USA), Borsuk, Eilenberg, Janiszewski, Knaster and Mazurkiewicz (Poland), Aleksandroff, Pontryagin, Kieldysh, (USSR), Reidemeister (Germany), Hopf (Switzerland) and many others. The Polish school contributed to it strongly, a.o. by the work of Karol Borsuk, who introduced and studied fundamental concepts in the theory of ANR's and in Shape Theory. There had been a strong interaction between the Israeli and Polish topologists a.o. in the study of hereditarily indecomposable continua and of their applications, as well as in the study of various aspects of dimension theory. The proposed session will concentrate on the current research in Geometric Topology, which includes also interactions with dynamical systems.

organizers: J. Dydak, M. Levin, S. Nowak, S. Spież, H. Toruńczyk

for more information contact: [Sławomir Nowak](#)

15. GEOMETRY OF PLANE CURVES

Of all the objects considered in modern geometry, the plane is the most interesting, and the most prolific in producing theorems. Furthermore, of all the objects of the plane, the curves seem to stand out as perfect objects to study, in the framework of both differential geometry and analytic geometry. Many people think that the theory of curves is already finished, but there are still many open problems whose solutions are extremely difficult to find. New results and new proofs of old results in this field have been published during the recent period. Moreover, the usage of various kinds of modern technology has transformed this theoretical field into an experimental one.

The purpose of this section is to present a series of results in the local and global theory of curves, which show vitality and attractiveness of these topics. The plane curves called ovals attained mathematical immortality by possessing many interesting properties and giving rise to many problems and generalizations.

Anyone is invited to participate in the session who has original, provocative or inspiring assertions or who wants to listen to comprehensive and interesting but not recreational mathematics.

organizers: T. Dana-Picard, W. Mozgawa

for more information contact: [Witold Mozgawa](#), [Thierry Dana-Picard](#)

16. HOMOTOPY THEORY

The section will be dedicated to the most recent results in algebraic topology, obtained by both the Israeli and Polish mathematicians. In particular, results in stable and unstable homotopy theory, homotopy algebra and category methods in homotopy theory will be presented. In addition, lectures on homotopy methods in manifolds theory and differential geometry will be provided.

organizers: D. Blanc, M. Golasiński

for more information contact: [Marek Golasiński](#)

17. NILPOTENT APPROXIMATIONS IN THE GOURSAT MONSTER TOWER

Goursat distributions – special fields of 2-planes in the tangent bundles to manifolds – have been investigated since the end of XIX century, since the works of Engel (1889) and von Weber (1898). These researchers believed that those objects were locally nothing but the canonical contact systems on the jet spaces $J^k(1, 1)$. It was only in 1978 when Kumpera and Ruiz discovered *singularities* hidden in Goursat *flags* – towers of consecutive Lie squares of an initial Goursat field of 2-planes. That triggered a wide array of results terminating recently in Montgomery & Zhitomirskii's book *Points and Curves in the Monster Tower*. Monster manifolds, equipped with universal Goursat distributions on them, are now perceived as certain compactifications of the spaces $J^k(1, 1)$ equipped with contact systems.

Local geometry of Goursat flags proves to be fairly involved, including unbounded numbers of continuous numerical *moduli*. Those moduli parametrize orbits within [most of] invariant strata of Jean's kinematics-driven (car + trailers) stratifications of the stages of Monster, nowadays called RVT-classes.

It is not yet known whether the moduli of Goursat distributions *descend* to the nilpotent approximations' level – the question asked by Agrachev in 2000. Nilpotent approximations (NA) are the most basic (and simple) thing associated locally with distributions. Agrachev's first guess was that probably 'yes', the moduli should descend. However, for a range of RVT classes, the answer eventually appears to be 'no'. Currently we both believe that 'no' is general in the Goursat world. Even more – that the NA depends solely on the RVT-class in question. The Section will present the state-of-the-art, and outline some fresh perspectives in the problem.

organizers: P. Mormul, M. Zhitomirski

for more information contact: [Piotr Mormul](#)

18. NONLINEAR ANALYSIS

This special session will be devoted to current trends in Nonlinear Analysis, with special emphasis on iterative methods for the solution of nonlinear problems, holomorphic, metric and topological fixed point theories, variational analysis, variational inequalities and optimization theory.

organizers: A. Cegielski, J. Jachymski, T. Kuczumów, S. Reich

for more information contact: [Andrzej Cegielski](#)

19. BANACH CENTER SECTION OPERATOR ALGEBRAS

The session will be devoted to the latest developments in the theory of operator algebras (both selfadjoint and non-selfadjoint) and its applications to mathematical physics, quantum groups, noncommutative probability and geometry, multivariable operator theory and dilation theory.

organizers: A. Skalski, B. Solel

for more information contact: [Adam Skalski](#)

20. REAL ANALYSIS

Real Analysis had always and still has a lot of interrelations with Set Theory, Topology, Measure Theory, Probability Theory, Functional Analysis, Complex Analysis, Partial Differential Equations and so on. The group of Polish mathematicians (among them students of prof. Zygmunt Zahorski and students of his students) working in Real Analysis had concentrated their efforts on the following topics:

- density topologies in Euclidean spaces for measure and category and their generalizations;
- generalized convergence of sequences and series of functions;
- the role of sigma-ideals (null sets, sets of the first category, microscopic sets, sets of Hausdorff measure zero etc.) in real analysis;
- dynamical systems for families of functions broader than continuous functions;
- Hugo Steinhaus and Sophie Piccard theorems;
- functions of bounded variations.

organizers: A. Olevskii, R. Pawlak, W. Wilczyński

for more information contact: [Ryszard Pawlak](#)



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