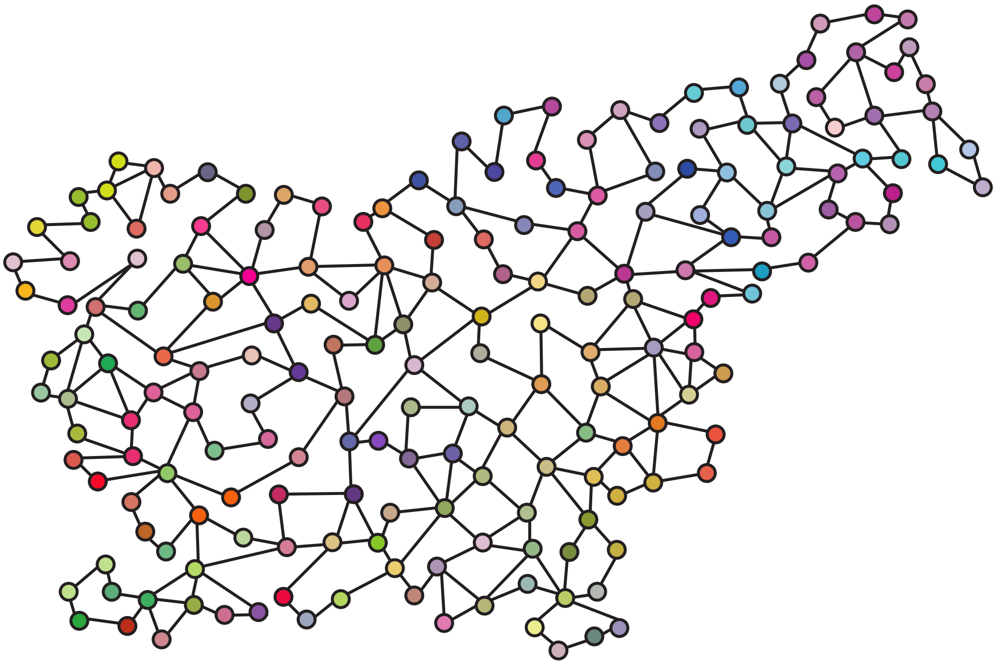


7TH PhD SUMMER SCHOOL in DISCRETE MATHEMATICS

ROGLA, SLOVENIA

JULY 23 - 29, 2017

Supported by ARRS (Slovenian Research Agency) and MIZŠ (Ministry of Education, Science and Sport).

Welcome

Dear Colleague!

Some of us have gathered here for the ninth consecutive year. What was started as an informal research collaboration has now grown into a colorful series of international workshops and summer schools. We are glad to see many participants returning and several new ones joining the creative atmosphere of this event, which we will try to keep as relaxed and uplifting as in previous years. The organization of the meeting comes as a combined effort of the Faculty of Mathematics, Natural Sciences and Information Technologies (UP FAMNIT) and the Andrej Marušič Institute (UP IAM), two members of the University of Primorska, and is in line with our goal to create an international research center in algebraic combinatorics in this part of the world.

We wish you a pleasant and mathematically fruitful week at Rogla.

Scientific Committee *(Klavdija Kutnar, Aleksander Malnič, Dragan Marušič, Štefko Miklavič, Tomaž Pisanski, Primož Šparl, Boris Zgrablić)*

General Information

7th PhD Summer School in Discrete Mathematics

Hotel Planja, Rogla, Slovenia, July 23 – July 29, 2017.

Organized by UP FAMNIT *(University of Primorska, Faculty of Mathematics, Natural Sciences and Information Technologies)* and UP IAM *(University of Primorska, Andrej Marušič Institute)*. In Collaboration with Centre for Discrete Mathematics, UL PeF *(University of Ljubljana, Faculty of Education)* and Slovenian Discrete and Applied Mathematics Society.

PhD Summer School in Discrete Mathematics Minicourses:

Topics in game theory
Vladimir Alexander Gurvich, *Rutgers University, NJ, USA and National Research University, Higher School of Economics, Moscow, Russia*
The history of combinatorics
Robin Wilson, *Open University, London, UK*

Scientific Committee:
Klavdija Kutnar, Aleksander Malnič, Dragan Marušič, Štefko Miklavič, Tomaž Pisanski, Primož Šparl, Boris Zgrablić

Organizing Committee:
Boštjan Frelih, Ademir Hujdurović, Boštjan Kuzman, Rok Požar

Supported by:
ARRS *(Slovenian Research Agency)*.
MIZŠ RS *(Ministry of Education, Science and Sport)*.

Website: https://conferences.famnit.upr.si/event/2/

MINICOURSE DESCRIPTIONS

Topics in Game Theory

Vladimir Alexander Gurvich
Rutgers University, NJ, USA
and
National Research University, Higher School of Economics, Moscow, Russia
gurvich@rutcor.Rutgers.edu

- Matrix, bimatrix, and n-person games in normal form; solving in pure and mixed strategies.
- Nash equilibrium (NE) in pure strategies for n-person games in normal and positional form. Nash-solvabile and tight game forms.
- On minimal and locally minimal NE-free bimatrix games.
- Domination of strategies and dominance equilibrium (DE).
- On Acyclicity, Nash- and Dominance-solvability of games and game forms.
- Effectivity Functions in Game, Voting, and Graph Theories.
- Characterizing Normal Forms of Positional Games and Read-Once Boolean Functions.
- Impartial games; Sprague-Grundy theory.

The History of Combinatorics

Robin Wilson
Open University, London, UK
r.j.wilson@open.ac.uk

- Ancient and renaissance combinatorics.
- The combinatorics of Leonhard Euler.
- 150 years of colouring problems in graph theory.
- Miscellaneous topics (the history of designs; 20th-century graph theory, etc.)

INVITED SPEAKERS

Help make a difference

Marco Buratti
University of Perugia, Italy

Difference methods are often very useful, sometimes even crucial, in the construction of various kinds of combinatorial designs. In this talk I will suggest some open problems concerning differences such as to establish for which groups G there exists a Steiner Triple System admitting G as an automorphism group acting sharply transitively on its points.

Some new development on edge-transitive graphs

Marston Conder
University of Auckland, New Zealand

Vertex-transitive graphs (and the sub-class of Cayley graphs) have been the object of study for many decades. On the other hand, there are many important graphs that are edge-transitive but not vertex-transitive (such as $K_{m,n}$ with $m \neq n$), and many vertex-transitive graphs that are not Cayley graphs (such as the Petersen graph, the Gray graph, and the Hoffman-Singleton graph).

In this talk, I will describe some recent developments in the theory and techniques for construction of edge-transitive graphs of various kinds.

First, I will briefly describe a new method of finding all edge-transitive graphs of up to given (small) order, which has resulted in quickly finding all such graphs of order less than 48. This is joint work with Gabriel Verret.

Then for the rest of the talk I will summarise some recent work with Yanquan Feng, Mi-Mi Zhang & Jinxin Zhou (Beijing) on *bi-Cayley graphs*, which are graphs that admit a group H of automorphisms acting semi-regularly on the vertices, with two orbits (of the same length). These include the Petersen graph and the Gray graph, and many more besides.

Our main focus was on the case where the 'bi-Cayley' group H is normal in the full automorphism group of the graph, and produced infinite families of examples in each of three sub-classes of bi-Cayley graphs, namely those that are arc-transitive, half-arc-transitive or semisymmetric, respectively.

In doing this, we found the answer to a number of open questions about these and related classes of graphs, posed by Li (in *Proc. American Math. Soc.* 133 (2005)), Marušič and Potočnik (in *European J. Combinatorics* 22 (2001)) and Marušič and Šparl (in *J. Algebraic Combinatorics* 28 (2008)). Also we found and corrected an error in a recent paper by Li, Song and Wang (in *J. Combinatorial Theory, Series A* 120 (2013)).

Resolving sets for higher dimensional projective spaces

György Kiss
Eötvös Loránd University, Hungary & University of Primorska, Slovenia

Let $R(n,q)$ be a resolving set for the point-hyperplane incidence graph of $\mathrm{PG}(n,q)$. Estimates on the size of $R(n,q)$ are presented in this talk. We prove that if q is large enough then

$$|R(n,q)| \geq 2nq - 2\frac{n^{n-1}}{(n-2)!}.$$

This generalizes tha planar result of *Héger* and *Takáts* (in *Electron. J. Combin.*, 19 (2012)) stating that the metric dimension of the point-line incidence graph of a projective plane of order q is $4q-4$.

Translating the result of *Fancsali* and *Sziklai* (in *Electron. J. Combin.*, 21 (2014)) about higgledy-piggledy lines to the language of resolving sets, we get that if $q = p^r$, $p > n$ and $q \geq 2n-1$ then $|R(n,q)| \leq (4n-2)q$. We improve their result and show that $|R(3,q)| \leq 8q$ and $|R(4,q)| \leq 12q$. In the cases $p < n$ and $q < 2n-1$ we prove that $|R(n,q)| \leq (n^2+n-6)q$.

Joint work with *Daniele Bartoli, Stefano Marcugini* and *Fernanda Pambianco.*

Oriented Regular Representations

Joy Morris
University of Lethbridge, Canada

A Graphical Regular Representation (GRR) for a group G is a Cayley graph on G whose full automorphism group is G. Similarly, a Digraphical Regular Representation (DRR) for G is a Cayley digraph on G whose full automorphism group is G. In the 1970s, a series of results showed that with some small exceptions and two infinite families of groups that have an obvious obstruction, every finite group admits a GRR. In 1980, Babai showed that with some small exceptions, every finite group admits a GRR. In the same paper, Babai discussed "oriented Cayley graphs": that is, Cayley digraphs $\mathrm{Cay}(G,S)$ with the property that $S \cap S^{-1} = \emptyset$. He defined an Oriented Regular Representation (ORR) for G to be an oriented Cayley graph on G whose full automorphism group is G. He pointed out one infinite family of groups that have an obvious obstruction, and noted that based on previous work it was already known that with one small exception, every group of odd order admits an ORR.

Pablo Spiga and I recently completed a series of 3 papers (two together, and one by him) proving that with some small exceptions and the infinite family pointed out by Babai, every finite group admits an ORR. I will present some history and overview of this problem, and give an idea of some of the techniques used in our proofs.

On non-commutative association schemes of rank 6

Mikhail Muzychuk
Netanya Academic College, Israel

An association scheme is a coloring of a complete graph satisfying certain regularity conditions. It is a generaliztion of groups and has many applications in algebraic combinatorics. Every association scheme yields a special matrix algebra called the Bose-Mesner algebra of a scheme. A scheme is called commutative if its Bose-Mesner algebra is commutative. Commutative schemes were the main topic of the research in this area for decades. Only recently non-commutative association schemes attracted attention of the researches. In my talk I'll present the results about non-commutative association schemes of the smallest possible rank, namely the rank 6.

This is a joint work with A. Herman and B. Xu.

The 3-dim Weisfeiler-Leman algorithm tests isomorphism of planar graphs

Ilya Ponomarenko
Petersburg Department of V. A. Steklov Institute of Mathematics, Russia

One of ingredients of Babai's quasipolynomial graph isomorphism test is the m-dimensional Weisfeiler-Leman algorithm (m-dim WL). In the present talk, we describe this algorithm explicitly as a procedure to construct a stable coloring of the m-tuples (the ordinary WL algorithm corresponds to the case $m = 2$). It will be explained why for $m \geq 3$, the m-dim WL tests isomorphism of any pair of planar graphs correctly (the previous known bound was $m \geq 14$). An easy example shows that the 1-dim WL does not recognize isomorphism of planar graphs. The question, whether $m = 2$ is enough, remains open.

Based on a joint paper with Sandra Kiefer and Pascal Schweitzer

Blocking sets with respect to special substructures of projective planes

Tamás Szőnyi
Eötvös Loránd University, Hungary

A substructure S of a projective plane is a set of points P and a set of lines L with the property that that every line $\ell \in L$ contains at least 2 points of P. A blocking set in S is a subset B of P with the property that every line in L contains at least one point of B. The aim is to prove (non-trivial) lower bounds on the size of blocking sets. This setting is too general to get interesting results, so we shall consider special substructures. For example the affine plane is such a substructure and for that case we have the famous results of Jamison, Brouwer-Schrijver, when the plane is desarguesian. This shows that one can get interesting results and the small blocking sets are not always related to small blocking sets of the entire projective plane. Another interesting substructure (again in the desarguesian plane) is to consider exterior (or secant) lines with respect to a given conic. In these cases there are results by Aguglia-Korchmáros, Giulietti-Montanucci, Blokhuis-Korchmáros-Mazzocca.

In the present talk we consider the following substructure: let us consider a desarguesian plane of order q^2 and let P be the union of the points of t disjoint Baer subplanes. It is well known that every line intersects P in either t or $q+t$ points. Let L be the set of lines meeting P in exactly $q+t$ points. One construction for a blocking set in this substructure is to take one subline in each Baer subplane, another one is to take one of the Baer subplanes. For small t, the first construction has size $t(q+1)$ and we show that they are the smallest blocking sets of this substructure if t is less than $\sqrt{q}/2$. For large t, the other trivial construction is optimal.

This is a joint work with Aart Blokhuis and Leo Storme.

CONTRIBUTED TALKS

Construction of Extremal Type II $\mathbb{Z}_4-$codes

Sara Ban
University of Rijeka, Croatia

The subject of this talk is the construction of extremal Type II $\mathbb{Z}_4-$codes. We will present our attempt to construct some new extremal Type II $\mathbb{Z}_4-$codes using binary codes with certain properties and given extremal Type II $\mathbb{Z}_4-$codes.

This is a joint work with Sanja Rukavina and Dean Crnković.

Point-ellipse configurations

Nino Bašić
University of Primorska, Slovenia

We will present point-ellipse configurations and point-conic configurations. Their basic properties will be described and two interesting families of balanced point-ellipse 6-configurations will be shown. The construction of the first family is based on the Cartesian product of two regular polygons, whilst the construction of the second family is based on Carnot's theorem. Finally, another interesting point-ellipse configuration based on the 24-cell will be introduced.

This is a joint work with Gábor Gévay, Jurij Kovič and Tomaž Pisanski.

Graph-indexed random walks

Jan Bok
Charles University, Czech Republic

I will talk about the recent development in the area of graph-indexed random walks. A *graph-indexed random walk* on graph G is a mapping $f : V(G) \to \mathbb{Z}$ such that there exists one vertex r (let us say root) with $f(r) = 0$ and for every $uv \in E(G)$ holds that $|f(u) - f(v)| \leq 1$. Graph-indexed random walks are sometimes reffered to as *Lipschitz mappings* of graphs.

Furthermore, the *average range* of graph G with fixed root is the arithmetic average of the sizes of homomorphic images of all possible Lipschitz mappings of graph G.

We will show our recent results on average range of graphs. Namely precise formulas for various classes and recent progress in attacking the Loebl-Nešetřil-Reed conjecture on average range.

This work is joint research with Jaroslav Nešetřil.

Spectral bounds obtained by reweighting entries in a row of a nonnegative matrix

Yen-Jen Cheng
National Chiao Tung University, Taiwan

For a square matrix C, the spectral radius $\rho(C)$ is defined as

$$\rho(C) := \max\{\,|\lambda| \;\mid \lambda \text{ is an eigenvalue of } C\},$$

where $|\lambda|$ is the magnitude of complex number λ. It is well known that

$$0 \le C \le C' \quad \Rightarrow \quad \rho(C) \le \rho(C'),$$

where C' is another square matrix of the same size. Now assume that C' has the the same row-sum sequence of C, C' has a positive eigenvector $v = (v_1, v_2, \dots, v_n)^T$ for $\rho(C')$ with the i-th entry the least (i.e. $v_i \le v_j$ for all j), and $C'[-|i)$ is the submatrix of C' obtained by deleting the i-th column. We will show that

$$0 \le C[-|i) \le C'[-|i) \quad \Rightarrow \quad \rho(C) \le \rho(C').$$

Modifying the proof, we also obtain the dual statement that

$$C[-|i) \ge C'[-|i) \ge 0 \quad \Rightarrow \quad \rho(C) \ge \rho(C').$$

Under the assumption that C is irreducible, the necessary and sufficient conditions in terms of C, C', and v for the above two equalities are provided. We provide a way to construct the above C' in which the position i mentioned above is known. When C' has suitable equitable quotient, we obtained a realization of some earlier bounds in the literature (Yingying Chen, Huiqiu Liu, Jinlong Shu in *Linear Algebra Appl., 439 (2013)*, X. Duan, B. Zhou in *Linear Algebra Appl. 439 (2013)*, Yuan Hong, Jin-Long Shu, Kunfu Fang in *J. Combin. Theory Ser. B 81 (2001)*, C.-A. Liu and C.-W. Weng in *Linear Algebra Appl., 438 (2013)*, R. P. Stanley in *Linear Algebra Appl. 87 (1987)*, J. Shu and Y. Wu in *Linear Algebra Appl., 377 (2004)*) by the spectral radius of matrices of smaller sizes. We will provide new applications.

This is a joint work with Chih-wen Weng.

Integrated Railway Planning at local scale

Franck Kamenga
SNCF Réseau, France

The European rail system is under pressure due to increasing demands of its users and public authorities (better quality of service, lower production costs). Railway capacity is a crucial issue for such busy networks. A good management of the capacity maximises the usage rate of the infrastructure, thus it increases its rentability. Stations and complex junctions strongly affect railway operation. Infrastructure managers need to plan traffic in those junctions by routing trains with a given timetable, it is the train platforming problem (TPP). Major stations includes several shunting yards with potential maintenance facilities where the rolling stock can be stored. The process of parking trains in those yards is the train unit shunting problem (TUSP). The TUSP and the TPP both have a specific litterature and are tackled separately by operators. Indeed the TPP is dedicated infrastructure managers. While, as the TUSP involves the rolling stock management, it is solved by train operators. The thesis aims at combine these two problems to provide a consistent and integrated planning in railway complexes.

TPP and TUSP both integrate a parking problem. Common models use graph colouring approaches. When routing has to be taken into account conflicts graph where nodes represent train assignations to a route is more relevant. The problem comes to the search of a stable set in the conflicts graph. In order to deal with variations of train shunting schedule. We propose to compare an approach based on a MILP formulation and an approximation that uses a decomposition. On one hand the parking problem is tackled with a permutation graph colouring algorithm. On the other hand the scheduling problem is solved with an exact heuristic.

This algorithm leads to experimentation with OpenGOV framework and CPLEX version 12.6. We tackle real instances of traffic at main French stations: Paris Gare de Lyon, Paris Est and Lyon Part-Dieu. Solutions can be otained in reasonable time (3 minutes for a 556 trains instance). Further works will focus on rolling stock rotations and maintenance constraint. We will also pay attention to alterantive decomposition approaches.

Fast and simple consensus in networks

Matjaž Krnc
Salzburg University, Austria & University of Primorska, Slovenia

We study the problem of distributed plurality consensus in a complete graph, in which initially every node holds one of k distinct opinions. We present a simple protocol which allows nodes to converge to the initial majority opinion, and improves the asymptotic running times of the current state-of-the-art protocols, for synchronous as well as for asynchronous models.

Some recent results on symmetric graphs

Boštjan Kuzman
University of Ljubljana, Slovenia

We present some recent results on symmetric graphs. Let X be a simple, connected, p-valent G-arc-transitive graph, where the subgroup $G \leq \mathrm{Aut}(X)$ is solvable and $p \geq 3$ is a prime. We prove that X is a regular cover over one of the three possible types of graphs with semiedges. We show how this enables short proofs of the facts that G is at most 3-arc-transitive on X and that its edge-kernel is trivial. For pentavalent graphs, two further applications are given: all G-basic pentavalent graphs admitting a solvable arc-transitive group are constructed and an example of a non-Cayley graph of this kind are constructed. We also show how similar methods can be used in order to complete and generalize some results on symmetries of tetravalent graphs. In particular, we use cyclic codes to characterize the elementary-abelian covers of doubled cycles.

Reconstructing perfect phylogenies via binary matrices, branchings in DAGs, and a generalization of Dilworth's theorem

Ademir Hujdurović & Martin Milanič
University of Primorska, Slovenia

A *perfect phylogeny* is a rooted tree representing the evolutionary history of a set of n objects. The objects bijectively label the leaves of the tree and there are m binary characters, each labeling exactly one edge of the tree. For each leaf, the set of characters that appear on the unique root-to-leaf path is the set of characters taking value 1 at the object labeling the leaf. While every perfect phylogeny naturally corresponds to an $n \times m$ binary matrix having objects as rows and characters as columns, the *perfect phylogeny problem* asks the opposite question: Does a given binary matrix correspond to a perfect phylogeny? The problem is well known to be polynomially solvable: the yes instances are characterized by the absence of pairs of conflicting columns, where two columns of a binary matrix are said to be in conflict if there exist three rows on which the two columns read 11, 10, and 01, respectively. The perfect phylogeny problem and various generalizations of it –many of which were proved intractable– have been extensively studied in computational biology.

We will discuss two generalizations of the perfect phylogeny problem motivated by applications in cancer genomics, first considered by Hajirasouliha and Raphael (WABI 2014) and later by Hujdurović et al. (2016, to appear in IEEE TCBB). Both problems are optimizations problems and can be defined as follows:

- The minimum conflict-free row split (MCRS) problem: split each row of a given binary matrix into a bitwise OR of a set of rows so that the resulting matrix has no pairs of conflicting columns (that is, it corresponds to a perfect phylogeny) and has the minimum number of rows among all matrices with this property.
- The minimum distinct conflict-free row split problem: the variant of the problem in which the task is to minimize the number of *distinct* rows of the resulting matrix.

Various graph theoretic and computational aspects of the two problems will be discussed, including:

– formulations of the two problems in terms of branchings in a derived directed acyclic graph,

– inapproximability results and approximation algorithms for the two problems,

– a heuristic for the MCRS problem improving on one given previously by Hujdurović et al. The algorithm is obtained by finding an optimal solution in a reduced search space via a new min-max result in weighted acyclic digraphs generalizing Dilworth's theorem.

Joint work with Edin Husić, Romeo Rizzi, and Alexandru I. Tomescu.

Riordan arrays - The Riordan Group

Nikolaos Pantelidis
Waterford Institute of Technology, Ireland

A Riordan array is a lower triangular infinite matrix, constructed by two functions which can be written as formal power series in such a way that each of the columns is generated by them. The entries of each column are the coefficients of the polynomial that is generated by these two functions. The elements of the matrix can be determined by a recursive formula. Riordan arrays are called after John Riordan, an American mathematician who was one of the pioneer researchers in Combinatorics. The area of Riordan arrays has been researched since the early 1990s and applications of them have been found in many areas of computing such as algorithm analysis, error correcting codes and wireless communications. Additionally, Riordan arrays have been used in different scientific areas beyond the borders of Mathematics as parts of their theory and techniques have been successfully applied in Molecular Biology for RNA secondary structure enumeration and Chemistry. Our main research focuses on the structure of the Riordan group, relations between already known Riordan subgroups, classifications of them and possible applications of the theory which is related to the Riordan group.

A Decomposition Approach to Solve the Selective Graph Coloring Problem in Certain Perfect Graph Families

Oylum Şeker
Boğaziçi University, Turkey

Graph coloring is the problem of assigning minimum number of colors to vertices of a graph such that no two adjacent vertices receive the same color. Selective Graph Coloring Problem is a generalization of the standard graph coloring problem; given a graph with a partition of its vertex set into clusters, the objective is to choose exactly one vertex per cluster so that, among all possible selections, the number of colors necessary to color the vertices in the selection is minimum. The selective graph coloring problem is known to be NP-hard, and remains so in many special classes of graphs. This study focuses on a decomposition based exact solution framework for selective coloring in certain perfect graph families; in particular, permutation, generalized split, and chordal graphs. Our method incorporates general integer programming techniques and combinatorial algorithms for the graph classes of interest. We test our method on graphs with various size and edge densities, present computational results and compare them to those of a pure integer programming formulation.

A FEW WORDS ABOUT THE UNIVERSITY OF PRIMORSKA

Established in 2003, the University of Primorska (UP) is the youngest of the three state universities in Slovenia. It consists of seven Faculties: Faculty of Mathematics, Natural Sciences, and Information Technologies (UP FAMNIT), Faculty of Built Environment, Faculty of Education, Faculty of Humanities, Faculty of Management, Faculty of Tourism, and Faculty of Health Sciences; and one research institute, the Andrej Marušič Institute (UP IAM).

With their international faculty and many research links all over the world, UP FAMNIT and its research counterpart UP IAM are at the forefront of the academic development of UP. Student enrollment at UP FAMNIT has grown from approximately 100 in its first academic year (2007/08), to 760 in the academic year 2016/17.

UP FAMNIT offers BSc, MSc, and PhD Degree programs in Mathematics, while faculty members carry out their research at UP IAM. Thus far, collaboration between UP FAMNIT and UP IAM has resulted in the following Graph Theory conferences and meetings:

- AC^2 – Algebraic Combinatorics on the Adriatic Coast, Koper, 2003, 2004, 2008, 2009.
- CoCoMat – Korea - Slovenia International Conference On Combinatorial and Computational Mathematics, Koper, 2007.
- SYGN - International Workshop on Symmetries of Graphs and Networks 2010, 2012, 2014.
- PhD Summer Schools in Algebraic Graph Theory 2011 and Discrete Mathematics 2012, 2013, 2014, 2015, 2016.
- 7th Slovenian International Conference on Graph Theory, Bled, 2011.
- Graph Theory Semester, Koper, May-June 2012.
- Computers in Scientific Discovery 6, August 2012.
- Algebraic and Topological Aspects of Graph Covers, January 2013.
- $DM = 60$ Conference on Graph Theory and Combinatorics, May 2013.
- Joint Conference of Catalan, Slovak, Austrian, Slovenian and Czech Mathematical Society, June 2013.
- International Conference on Graph Theory and Combinatorics, May 2014.
- Ljubljana - Leoben Graph Theory Seminar 2014, September 2014.
- 2015 International Conference on Graph Theory, May 2015.
- Algorithmic Graph Theory on the Adriatic Coast, June 2015.
- 8^{th} Slovenian International Conference on Graph Theory, Kranjska Gora, June, 2015. (a.k.a. the Bled conference).
- PhD Spring School in Algebraic Graph Theory, Pale, Bosnia and Herzegovina, May, 2017.

Visit `www.famnit.upr.si` for more information on UP FAMNIT's graduate programs in mathematics and related fields. Visit `www.iam.upr.si` for more information on research.

PUBLISHING

ARS MATHEMATICA CONTEMPORANEA

Ars Mathematica Contemporanea (AMC) is an international journal, published by UP in collaboration with IMFM and the Slovenian Society of Mathematicians, Physicists and Astronomers.

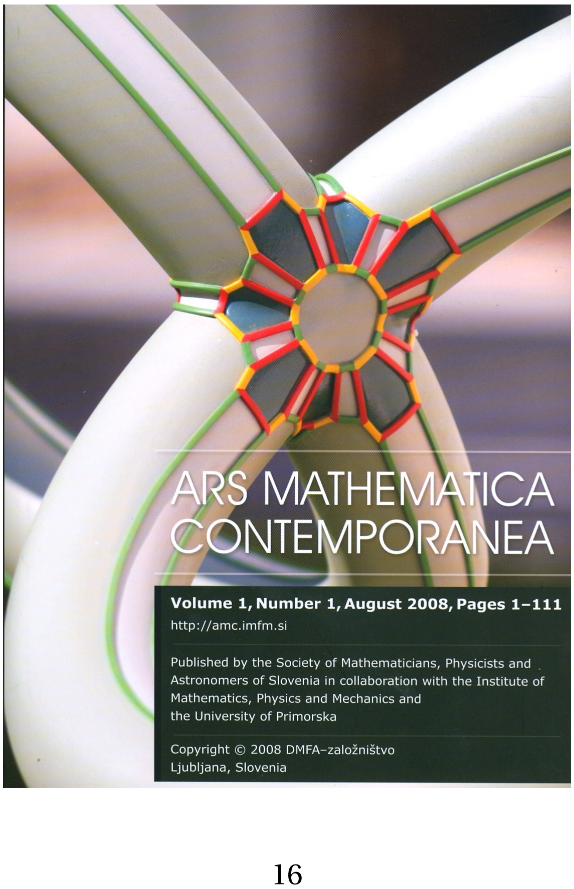
The aim of AMC is to publish peer-reviewed high-quality articles in contemporary mathematics that arise from the discrete and concrete mathematics paradigm. It favors themes that combine at least two different fields of mathematics. In particular, papers intersecting discrete mathematics with other branches of mathematics, such as algebra, geometry, topology, theoretical computer science, and combinatorics, are most welcome.

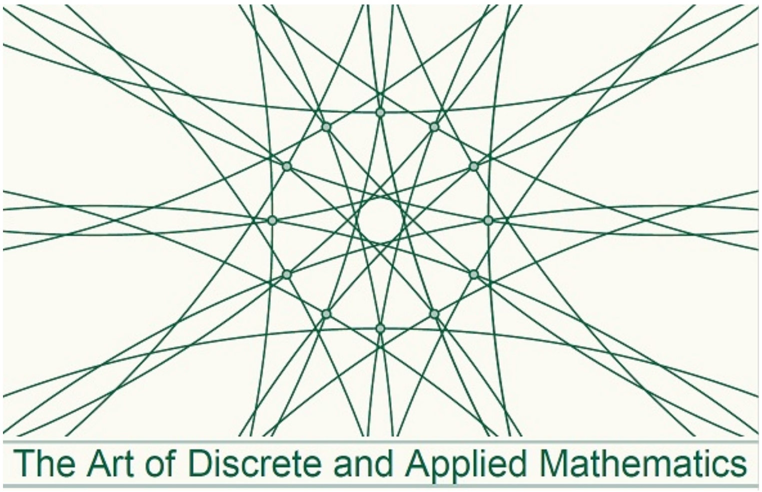
In 2015 the Ars Mathematica Contemporanea Journal (AMC) was once again ranked as the best Slovene scientific journal. It's impact factor for 2015 was 0.985, which landed the journal in the first quarter of scientific journals in the field of mathematics.

The idea for the magazine was launched in 2008 by Tomaž Pisanski and Dragan Marušič. Together with an international editorial team they are still managing the journal.

For more information on submissions, please refer to the AMC website

`http://amc-journal.eu`.





UP FAMNIT and Slovenian Discrete and Applied Mathematics Society publish international mathematical journal *The Art of Discrete and Applied Mathematics (ADAM)*.

The journal is platinum open access, purely electronic journal that will publish high-quality articles in contemporary mathematics that arise from the discrete and concrete mathematics paradigm.

The journal is published once a year in English language with abstracts in Slovene. It favours themes from discrete and applied mathematics and welcomes original interesting important results in a form of articles and notes, preferably not exceeding 15 pages, as well as longer survey papers.

Papers covering single topics such as graph theory, combinatorics, algorithmic graph theory, combinatorial optimization, and chemical graph theory that are not preferred by its sister journal Ars Mathematica Contemporanea (AMC) are most welcome here.

The papers are peer-reviewed by international experts and all published articles are under the CC copyright protection.

The journal is published by the editorial board led by Editors in Chief Dragan Marušič and Tomaž Pisanski.

For more information on submissions, please refer to the AMC website

`http://adam-journal.eu`.

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Rogla, Slovenia, July 23 – July 29 , 2017.

Edited by Boštjan Frelih.

Koper, July 2017.