9th PhD Discrete Summer School in Mathematics

Rogla, Slovenia

June 30 – July 6 2019

Supported by EMS (European Mathematical Society), ARRS (Slovenian Research Agency) and MIZS (Ministry of Education, Science and Sport).

WELCOME

Dear Colleague!

Some of us have gathered here for the tenth 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), the Andrej Marušič Institute (UP IAM), two members of the University of Primorska, and the Slovenian Discrete and Applied Mathematics Society, 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 *(Ademir Hujdurović, Klavdija Kutnar, Aleksander Malnič, Dragan Marušič, Štefko Miklavič, Primož Šparl)*

GENERAL INFORMATION

9th PhD Summer School in Discrete Mathematics

Hotel Planja, Rogla, Slovenia, June 30 – July 6, 2019.

Organized by

UP FAMNIT *(University of Primorska, Faculty of Mathematics, Natural Sciences and Information Technologies);*
UP IAM *(University of Primorska, Andrej Marušič Institute);*
Slovenian Discrete and Applied Mathematics Society.

In Collaboration with

Centre for Discrete Mathematics, UL PeF *(University of Ljubljana, Faculty of Education).*

PhD Summer School in Discrete Mathematics Minicourses:
COMBINATORIAL LIMITS AND THEIR APPLICATIONS IN EXTREMAL COMBINATORICS
Daniel Král', *Masaryk University, Czech Republic and University of Warwick, United Kingdom*
COMBINATORIAL METHODS IN GROUP THEORY (AND GROUP-THEORETICAL METHODS IN COMBINATORICS)
Marston Conder, *University of Auckland, New Zealand*

Scientific Committee:
Ademir Hujdurović, Klavdija Kutnar, Aleksander Malnič, Dragan Marušič, Štefko Miklavič, Primož Šparl

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

Sponsors:
EMS *(European Mathematical Society)*;
ARRS *(Slovenian Research Agency)*;
MIZS *(Ministry of Education, Science and Sport)*.

Website: https://conferences.famnit.upr.si/event/12/

MINICOURSE DESCRIPTIONS

Combinatorial limits and their applications in extremal combinatorics

Daniel Král'
Masaryk University, Czech Republic and University of Warwick, United Kingdom
dkral@fi.muni.cz

The theory of combinatorial limits provide analytic tools to represent and analyze large discrete objects. Such tools have found important applications in various areas of computer science and mathematics. Combinatorial limits are also closely related to the flag algebra method, which led to solving several long-standing open problems in extremal combinatorics.

The course will be focused on limits of dense graphs and permutations. We will explore the links to the regularity method and present a brief tutorial on the flag algebra method, which will be demonstrated on several problems from extremal combinatorics.

The tentative syllabus of the tutorial is the following:

1. Introduction - dense graph convergence, graph limits.
2. Graph and permutation quasirandomness via limits.
3. Flag algebra method and its relation to graph limits.
4. Applications of flag algebra method in combinatorics.
5. Computer assisted use of flag algebras via SDP.

Combinatorial methods in group theory (and group-theoretical methods in combinatorics)

Marston Conder
University of Auckland, New Zealand
m.conder@auckland.ac.nz

This course will describe a range of combinatorial methods that are helpful in group theory. Along the way it will also include some applications of group theory to combinatorics, and especially to the study of symmetry of discrete objects (such as graphs and maps). It will begin with some applications of simple counting, and then methods for finding pseudo-random elements of a group, and lead on to Cayley graphs, coset graphs and double-coset graphs and their various applications, and finish with a section on Möbius inversion on subgroup lattices. Lots of examples and figures will be given to explain and illustrate these things.

The provisional syllabus is as follows:

1. Basic applications of counting (incl. to Lagrange's theorem, the class equation and Sylow theory).
2. Methods for generating random or pseudo-random elements of a group.
3. Cayley graphs [briefly].

4. Schreier coset graphs and their applications (incl. to permutation representations, coset enumeration, finiteness of finitely-presented groups, the Ree-Singerman theorem on transitivity of a group of permutations, and graphical implementation of Reidemeister-Schreier theory).
5. Back-track search methods for finding all subgroups of small index in a finitely-presented group.
6. Double-coset graphs and their applications (incl. to construction of vertex-transitive graphs).
7. Möbius inversion on lattices, and applications to groups.

INVITED SPEAKERS

Layered H-partitions with applications

Vida Dujmović
University of Ottawa, Canada

We introduce a new structural tool called layered H-partitions, and prove that every planar graph has such a partition of bounded layered width in which H has bounded treewidth. These results generalise for graphs that exclude an apex graph as a minor. With the help of this tool we settle two long-standing problems, one on queue-number of planar graphs of Heath, Leighton and Rosenberg from 1992 and one on the non-repetitive chromatic number of planar graphs by Alon, Grytczuk, Haluszczak and Riordan from 2002.

The awesome diversity of the clique graph operator dynamics

Miguel Angel Pizaña
Universidad Autónoma Metropolitana-Iztapalapa, Mexico

The class of all graphs $\mathscr{G}$ together with an operator $\Phi : \mathscr{G} \to \mathscr{G}$ constitute a *graph dynamic system*. Special interest is paid to the effects of applying the respective *iterated operators*: $\Phi^0(G) = G$, $\Phi^{n+1}(G) = \Phi(\Phi^n(G))$. Many natural questions arise in this context including, which graphs are Φ-*invariant* ($\Phi(G) \cong G$), Φ-*convergent* ($\Phi^n(G) \cong \Phi^m(G)$ for some $n < m$) or Φ-*divergent* ($\lim_{n\to\infty} |\Phi^n(G)| = \infty$).

In particular, the clique operator K transforms a graph G into the clique graph $K(G)$, which is the intersection graph of the maximal cliques of G. The clique graph operator is one of the most studied due to the huge richness of the corresponding graph dynamic system. Clique graphs have even been used in Loop Quantum Gravity to explain how the quantum spacetime foam (and classic spacetime) could emerge from a more basic, discrete reality underlying at the Plank's length scale.

More recently, the problem of algorithmic decidability of the K-divergence has begun to be studied. For this, some electronic gates and circuits have been simulated within the clique graph dynamics. And the preliminary results seem to suggest that the clique graph dynamics has at least the computational power of Linearly Bounded Automata (i.e. computers with finite memory like real computers, but unlike Turing machines).

In this talk, we shall show a very visual general overview of the several breakthroughs made in the last 50 years.

This talk is based on several works by C. Cedillo, F. Escalante, F. Larrión, V. Neumann-Lara, M. Pizaña, J. Szwarcfiter, R. Villarroel-Flores and others.

Small maximal independent sets

Jeroen Schillewaert
University of Auckland, New Zealand

We study random constructions in incidence structures using a general theorem on independent sets in (hyper)graphs. Our main result applies to a wide variety of well-studied problems in finite geometry to give almost tight bounds on the sizes of various substructures. This is joint work with Michael Tait (Carnegie Mellon) and Jacques Verstraete (UCSD).

Graphs as curves and special points on them

Klara Stokes
Maynooth University, Ireland

Graphs share many properties with algebraic curves. Recently, a series of classical results valid for curves have been given analogs for graphs, such as the Riemann-Roch Theorem and the Riemann-Hurwitz Theorem. These results imply for example that every vertex has associated a certain finite sequence of positive integers called gap sequence, in analogy with the concept of Weierstrass gaps of an algebraic curve. The analysis of these sequences of gaps involves techniques such as chip-firing, cohomology, graph covers and representation theory.

STUDENT TALKS

Classification of geodesic self–dual surfaces

Markus Baumeister
RWTH Aachen University, Germany

We consider a special class of combinatorial simplicial surfaces that can be described by certain subgroups of the COXETER–group $T_d := \langle a, b, c \mid a^2, b^2, c^2, (ab)^3, (ac)^2, (bc)^d \rangle$ (with $d \geq 3$). We introduce the notion of *geodesic duality* on these surfaces and observe how it exchanges the roles of "local" and "global" information of a surface.

By switching between geometric and algebraic descriptions, we show that geodesic self–dual surfaces can be characterised by certain subgroups of a quotient group of T_d. In particular, we are able to show that the groups $\langle a, b, c \mid a^2, b^2, c^2, (ab)^3, (ac)^2, (bc)^d, (bac)^d \rangle$ are pairwise non–isomorphic (except for $d \in \{3, 4, 7\}$).

Minimum coloring games

Jan Bok
Charles University, Czech Republic

I shall give a broader introduction to the area of combinatorial optimization games. The talk will focus on minimum coloring games, introduced by Deng, Ibaraki and Nagamochi in 1999. A *minimum coloring game*, assigned to a graph $G = (V, E)$, is a pair (V, v) such that $v(S) = \chi(G[S])$ for all $S \subseteq V$. In classical cooperative game theory, the value $v(S)$ is interpreted as a cost that needs to be paid by the subset S. The main problem is to find stable vectors dividing costs between players in given game. One of the most extensively studied stable allocation is *core*.

The main part of my talk will be devoted to algorithmic problems of determining key properties of core – *emptiness*, *exactness*, and *largeness* – for two important subclasses of planar graphs – outerplanar graphs and triangulated graphs.

On the arithmetical Davenport constant of plus-minus weighted zero-sum sequences over finite abelian groups

Safia Boukheche
LAGA, Paris 8 University, France and RECITS, USTHB, Algeria

Let G be a finite, abelian group written additively and let $S = g_1 g_2 \dots g_l$ be a sequence over the group G. Let $\sigma_{\pm}(S)$ be the set of the $\pm$-weighted sums of S, that is the set of all elements of the form $\sum_{i=1}^{l} \epsilon_i g_i$ with $\epsilon_i \in \{-1, +1\}$ and $\mathscr{B}_{\pm}(G)$ the set of sequences S such that $0 \in \sigma_{\pm}(S)$. A sequence $S \in \mathscr{B}_{\pm}(G)$ is called a $\pm$-weighted zero-sum sequence. If it is not possible to write $S = S_1 S_2$ with non-empty $S_1, S_2 \in \mathscr{B}_{\pm}(G)$, then S is called a minimal $\pm$-weighted zero-sum sequence. The set of these elements is denoted by $\mathscr{A}(\mathscr{B}_{\pm}(G))$.

In this talk we will concentrate on the arithmetical Davenport constant denoted by $D(\mathscr{B}_{\pm}(G))$. It is defined as the maximum length of a sequence in $\mathscr{A}(\mathscr{B}_{\pm}(G))$. and we compare it to related constants such as the classical Davenport constant $D(G)$. We show that

$D(\mathscr{B}_{\pm}(G)) \leq D(G)$ and if $|G|$ is odd then equality holds. By contrast, for $n \geq 4$ even, we have

$$1 + \frac{n}{2} = D(\mathscr{B}_{\pm}(C_n)) < D(C_n) = n$$

where C_n denotes a cyclic group of order n.

Time permitting further arithmetical results will be discussed. This in joint work with K. MERITO, O. ORDAZ, W. SCHMID.

Non-negativity, sums of squares, symmetry & limits

Sebastian Debus
University of Vienna, Austria

In 1888 Hilbert proved that the set of non-negative real forms of degree 2d in n variables equals the set of sums of squares only in very few cases. However, when one considers the linear action of a finite Coxeter group on R[x] and restricts to the question whether invariant non-negative forms, or even limits of symmetric forms, have to be sums of squares this classification does not remain true.

In this talk, we will outline how the non-negativity vs. sums of squares question can be addressed with methods from convex geometry (G. Blekherman arXiv:10103465) and how symmetry is being used in the conical study to reduce the complexity (C. Riener and G. Blekherman arXiv:1205.3102). Furthermore, we will present an example from the speakers master thesis.

Growth series for Artin groups, languages, and geometry

Islam Foniqi
University of Milano-Bicocca, Italy

The main objects for us will be the Artin groups, which are finitely presented, and one defines their canonical presentation using a Coxeter system. Then we introduce spherical and geodesic growth series, paying attention to their rationality (which represents a key aspect of this discourse). The regular languages, which are characterized by finite-state automata, appear naturally here since their growth series are rational. Geodesics can also be seen as particular paths on a Cayley Graph; this point of view allows the use of geometric tools to show regularity of the language of geodesics.

Unique path partitions: motivation, classification and counting

Nils Gubela
University of Vienna, Austria

We define up-partitions as labels for conjugacy classes of S_n where all non-zero irreducible character values are 1 or -1, i.e., they are sign partitions as defined by J. B. Olsson. We will see some properties of sign partitions and up-partitions in particular and will work towards a classification theorem for up-partitions. After this we will look at some results of C. Bessenrodt, J. B. Olsson and J. Sellers about generating functions for up-partitions.

Regular maps with external symmetries

Olivia Jeans
The Open University, United Kingdom

A regular map is a highly symmetric cellular embedding of a graph on a surface. Such maps sometimes exhibit external symmetries such as self-duality and/or self-Petrie-duality. Regular maps whose automorphism group is a linear fractional group PSL(2,p) have been studied for many years and the theory is well-developed including generating sets for the associated groups. We present the conditons for such maps to have each of these external symmetries and outline the use of these results to prove the existence of a self-dual, self-Petrie-dual regular map of arbitrary odd valency ≥ 5.

Based on joint works with Grahame Erskine, Jay Fraser, Katarína Hriňáková, and Jozef Širáň.

Extending partial representations of adjusted interval digraphs

Nikola Jedličková
Charles University, Czech Republic

Adjusted interval graphs have been studied as the right digraph analogue of interval graphs. For interval graphs, there are polynomial algorithms to extend a partial representation by given intervals into a full interval representation. In my talk, I will speak about a polynomial algorithm for extending partial representations of adjusted interval digraphs.

The talk is based on joint work with Jan Bok and Pavol Hell.

Polyhedral and algebraic approaches to the k-dimensional multiplication table problem

Anna Limbach
RWTH Aachen University, Germany

My subject of study is the k-dimensional multiplication table problem. The fundamental question is the following: How many different products can occur when multiplying k numbers from the range $\{1,\dots,n\}$? I will call this number $p(k,n)$. In contrast to the work of D. Koukoulopoulos, I consider n fixed and want to express $p(k,n)$ for all positive integers k.

Combining Ehrhart theory and commutative algebra, R. Scheidweiler and E. Triesch showed that for fixed n there is a non-negative integer k_n and a polynomial q_n such that for every $k \geq k_n$ the number of different products $p(k,n)$ is equal to $q_n(k)$. Furthermore, the degree of q_n is the number of prime numbers smaller or equal to n.

In my talk, I will first explain the work of Scheidweiler and Triesch, focusing on the algebraic approach. In the second part, I talk about the number k_n and the conjecture that it might be 0 for every n.

Card shuffling and particle systems

Rodrigo Marinho
IST, University of Lisbon, Portugal

There are many ways to shuffle a deck of cards and an interesting question to make is: how long should a person shuffle it in order to mix it up? We will discuss the answer to this question for different kinds of card shuffles and we will connect one of them with a very famous particle system called exclusion process. Not only will we show known results obtained in the last years for the mixing time of this system, but we will also show results obtained in collaboration with P. Gonalves, M. Jara and O. Menezes for the exclusion process with reservoirs, where most of the combinatoric arguments used in the previous works fails.

On $\mathbb{Z}$-flow-continuous maps between cubic graphs

Davide Mattiolo
University of Modena and Reggio Emilia, Italy

A $\mathbb{Z}$-flow in an oriented graph $\vec{G}$ is an assignment $\phi : E(\vec{G}) \to \mathbb{Z}$ such that, at each vertex, the sum of all incoming flow values equals to the sum of all outgoing ones. A map $f : E(\vec{G}) \to E(\vec{H})$ between the edge sets of two oriented graphs is called $\mathbb{Z}$-flow-continuous if $\phi \circ f$ is a $\mathbb{Z}$-flow in $\vec{G}$ for every $\mathbb{Z}$-flow ϕ in $\vec{H}$. The existence of $\mathbb{Z}$-flow-continuous maps naturally defines a quasi-order $\succ_{\mathbb{Z}}$ on the class of finite graphs. In this talk we discuss old and new results on such quasi-order when restricted to cubic graphs. In particular we give an operative description of such maps when restricted to cyclically 4-edge-connected cubic graphs and show that this order contains many graphs which are incomparable with the Petersen graph and K_4.

Construction of a new family of directed strongly regular graphs

Juan Manuel Montoya
University of the Basque Country, Spain

Starting from the construction given in the paper by García, Kutnar, Malnič, Martínez, Marušič and Montoya "Construction of infinite families of vertex-transitive directed strongly regular graphs", we proceed to construct new infinite families of directed strongly regular graphs, which have automorphism groups with bigger automorphism groups than the ones given in the aforementioned paper. Also, we are able to give the form of the parameters of these directed strongly regular graphs.

Hadamard matrices and $\mathbb{Z}_4$-linear codes

Matteo Mravić
University of Rijeka, Croatia

A $\mathbb{Z}_4$-linear code of length n is a $\mathbb{Z}_4$ sub-module of $\mathbb{Z}_4^n$. In the Pless-Leon-Fields article "All Z4 codes of Type II and length 16 are known" a method for construction of self-dual $\mathbb{Z}_4$-linear codes is presented. The starting point of this construction is a doubly-even self-orthogonal binary code. It is known that binary linear codes obtained from Hadamard 3-designs satisfy these conditions.

In this talk I will present a method for obtaining binary codes from Hadamard 3-designs of length $4n$ starting from skew-symmetric Hadamard matrices of order n. Also I will present some $\mathbb{Z}_4$-linear codes that we obtained so far and some partial results.

This is joint work with Dean Crnković and Sanja Rukavina.

Locally toroidal hypertopes

Claudio Alexandre Piedade
Universidade de Aveiro, Portugal

A hypertope is a thin residually-connected incidence geometry, that is a combinatorial concept generalizing what is known as abstract polytope. In this talk, some examples of regular hypertopes with toroidal residues will be given, following the work of M. Elisa Fernandes, Asia Weiss and Dimitri Leemans.

Testing isomorphism of circular-arc graphs in polynomial time

Peter Zeman
Charles University, Czech Republic

A graph is said to be circular-arc if the vertices can be associated with arcs of a circle so that two vertices are adjacent if and only if the corresponding arcs overlap. It is proved that the isomorphism of circular-arc graphs can be tested by the Weisfeiler-Leman algorithm after individualization of two vertices, which settles a 40-year-old open problem.

Perfect matchings in the line graphs of complete graphs and hamiltonicity

Jean Paul Zerafa
University of Modena and Reggio Emilia, Italy

A graph has the Perfect-Matching-Hamiltonian-property (for short the *PMH*-property) if every perfect matching can be extended to a hamiltonian cycle. Let G be a hamiltonian graph. It can be easily shown that the line graph of G, denoted by $L(G)$, is hamiltonian as well. We have recently studied the *PMH*-property in the line graphs of various classes of graphs. In particular, we show that if G is a complete graph having an even number

of edges, then, every perfect matching in $L(G)$ can be extended to a hamiltonian cycle. Apart from this result, we also give a brief overview of our work and suggest possible future directions.

Joint work with Marién Abreu (University of Basilicata), John Baptist Gauci (University of Malta), Domenico Labbate (University of Basilicata) and Giuseppe Mazzuoccolo (University of Verona).

Constructing block designs from orbit matrices using a modified genetic algorithm

Tin Zrinski
University of Rijeka, Croatia

Genetic algorithms (GA) are search and optimization heuristic population-based methods which are inspired by the natural evolution process. In this talk, we will present a method of constructing incidence matrices of block designs combining the method of construction with orbit matrices and a modified genetic algorithm.

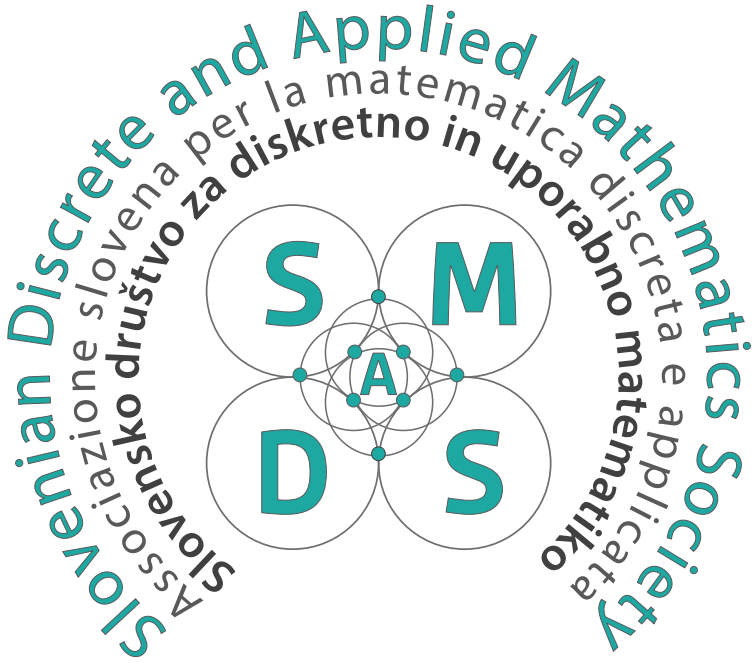
On constructions of directed strongly regular graphs from groups

Matea Zubović
University of Rijeka, Croatia

Regular directed graph $\mathscr{G}$ of degree k with n vertices is directed strongly regular graph, $DSRG(n,k,\lambda,\mu,t)$, if number of directed paths of length two from every vertex v to every vertex w is λ if there exists directed edge $v \to w$, t if $v = w$ and μ if there is no edge $v \to w$. Directed strongly regular graphs were introduced by Art Duval in 1988.

One can construct 1-design by defining a basic block as union of G_α-orbits of transitive permutation group. Using that, we will construct directed strongly regular graphs from transitive and non-transitive groups.

A FEW WORDS ABOUT
SLOVENIAN DISCRETE AND APPLIED MATHEMATICS SOCIETY



Slovenian Discrete and Applied Mathematics Society was founded in Koper (Slovenia), on 14 December 2016. The aim of this society is to promote the mathematical sciences, with special emphasis given to discrete and applied mathematics. The Society is research-oriented, and publishes scientific literature and organises scientific meetings such as this one. In particular, it is involved in publishing *Ars Mathematica Contemporanea* and *The Art of Discrete and Applied Mathematics* . It has members, fellows and honorary members.

A 'Member' may be any individual actively engaged in mathematical research, as evidenced in practice by authorship of a paper covered by *MathSciNet* or *Zentralblatt für Mathematitik*, or by enrolment in a research degree (and supported by a recommendation letter from the student's supervisor).

A 'Fellow' is a member who has strong international visibility and has made a positive impact on mathematics in Slovenia. Typically, a fellow would be expected to have at least 500 citations in the *MathSciNet* database, or be noted for some other achievements (such as an international award, or having given a keynote address in a large conference, or supervised a PhD student in or from Slovenia).

An 'Honorary Member' is an individual who has made outstanding contributions to the development of discrete or applied mathematics in Slovenia.

The Society has a Council to oversee its operations. It has a Nomination Committee, for nominating candidates for fellowship, and for considering candidates for honorary membership. Under the current rules, the Council of the Society will elects new Fellows and a limited number of Honorary Members at its annual meeting each year.

On 23 June 2018 the Council of the EMS approved unanimously the application of the Society for full membership of EMS. SDAMS is the first mathematics society from Eastern Europe that is member of the EMS and does not cover only pure mathematics.

SLOVENIAN DISCRETE AND APPLIED MATHEMATICS MEMBERSHIP FORM

Slovensko društvo za diskretno in uporabno matematiko
Associazione slovena per la matematica discreta e applicata
Slovenian Discrete and Applied Mathematics Society

Membership Form

Name: _____
Affiliation: _____
I am a mathematician and would like to become a member of the **Slovenian Discrete and Applied Mathematics Society.**

MyAuthor ID in MathSciNet: _____ or in zbMATH: _____.
Students who do not have these IDs yet should include a letter of reference by their advisor.

E-mail Address: _____,
Delivery Address: _____.

(Bylaws of the Society are available at the Society web page: `www.sdams.si`.)

I agree that my name be listed in the Society Membership list

YES NO (Circle your choice)

Signature: _____.
Place: _____.
Date: _____.

Fill this form, sign it and send scan to: `info@sdams.si`.
or send it by ordinary mail to:

Slovensko društvo za diskretno in uporabno matematiko
Kettejeva 1
6000 Koper

After the Executive Committee confirms your application you will receive your Membership ID. You should include your Membership ID in any correspondence with the Society and use it with your bank transfer. The membership fee for 2019 is 20 EUR. Instructions for submitting your payment of the Membership Fee are available at the Society web page.

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: the Faculty of Mathematics, Natural Sciences, and Information Technologies (UP FAMNIT); the Faculty of Built Environment; the Faculty of Education; the Faculty of Humanities; the Faculty of Management; the Faculty of Tourism; and the Faculty of Health Sciences; and one research institute, the Andrej Marušič Institute (UP IAM).

With 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 568 in the academic year 2018/19.

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.
- 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, 2017, 2018.
- 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 Math. 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.
- PhD Spring School in Algebraic Graph Theory, Pale, BiH, May, 2017.
- Graphs, groups, and more: celebrating Brian Alspach's 80th and Dragan Marušič's 65th birthdays, Koper, May-June, 2018.
- Software Tools for Mathematics, Koper, August, 2018.
- Discrete Biomathematics Afternoon at the Adriatic Coast 2019, Koper, February, 2019.

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, the Slovenian Discrete and Applied Mathematics Society and the Slovenian Society of Mathematicians, Physicists and Astronomers.

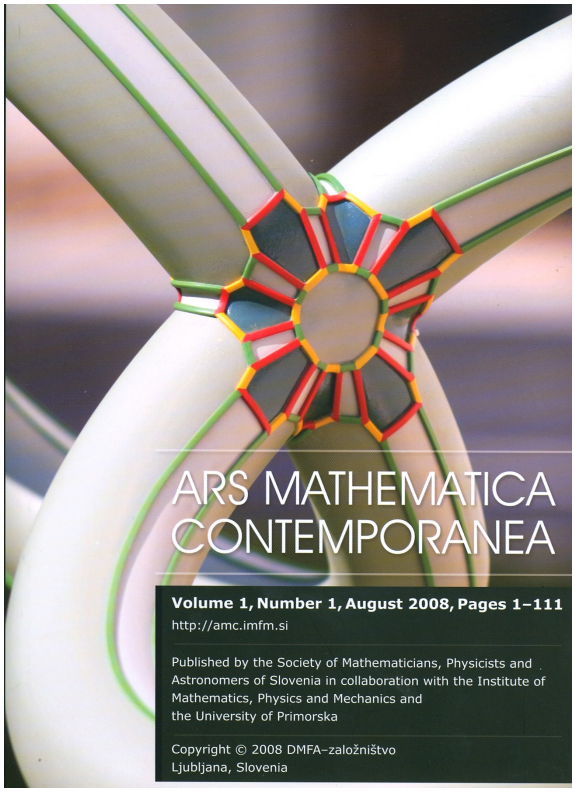
The aim of AMC is to publish peer-reviewed high-quality articles in contemporary mathematics that arise from the discrete and concrete mathematics paradigm. It favors themes that combine at least two different fields of mathematics. In particular, papers intersecting discrete mathematics with other branches 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. Its impact factor for 2015 was 0.985, which landed the journal in the top quartile for scientific journals in the field of mathematics. In 2016 and 2017, the journal was placed in the second quartile with impact factors 0.87 and 0.793, respectively.

This journal 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 and the Slovenian Discrete and Applied Mathematics Society also publish the international mathematical journal *The Art of Discrete and Applied Mathematics (ADAM)*.

This is a purely electronic, platinum open access 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 the English language with abstracts in Slovene. It favours themes from discrete and applied mathematics and welcomes original interesting important results in the 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 do not fall under the mandate of its sister journal Ars Mathematica Contemporanea (AMC) are most welcome here.

The papers are peer-reviewed by international experts and all published articles appear under a CC (Creative Commons) copyright license.

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

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

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

A FEW WORDS ABOUT
THE 8TH EUROPEAN CONGRESS OF MATHEMATICS 2020

UP mathematicians, in cooperation with representatives of all Slovene mathematical research institutions, have been granted the honour of organizing the 8th European Congress of mathematics in 2020 (8ECM). The Council of the European Mathematical Society, which gathered at the 7th European Congress of Mathematics in Berlin in July 2016, recognized the potential of the Slovenian proposal. In entrusting to us the organization of the next congress, the Council expressed its deepest confidence in Slovenian researchers. Their decision was greeted with enthusiasm and satisfaction.

In addition to the official program, special minisymposia, lectures and other events are planned. These will make the congress a lively forum of mathematical diversity for researchers, professors, teachers and students. Organizers welcome all interested participants, and will offer support for students and mathematicians from disadvantaged backgrounds.

The proposal to host this event was put forward by UP FAMNIT, in collaboration with UP IAM, University of Ljubljana, Faculty of Mathematics and Physics & Faculty of Education, University of Maribor, Faculty of Natural Sciences and Mathematics, and all other organizations active in the field of mathematics in Slovenia. It was also supported by the Slovenian Ministry of Education, Science and Sport, the Slovene Research Agency, the Slovenian Academy of Sciences and Arts and the Slovenian Rectors' Conference.

Visit `www.8ecm.si` for more information.

9th PhD Summer School in Discrete Mathematics
Rogla, Slovenia, June 30 – July 6, 2019.

Edited by Boštjan Frelih.

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