西北工業大學
NORTHWESTERN POLYTECHNICAL UNIVERSITY

程序册
PROGRAM

第七届西安国际图论与组合数学研讨会
The 7th Xi'an International Workshop on Graph Theory and Combinatorics

主办单位：西北工业大学
SPONSOR: NORTHWESTERN POLYTECHNICAL UNIVERSITY

承办单位：西安-布达佩斯组合数学联合研究中心
ORGANIZERS: XI'AN-BUDAPEST JOINT RESEARCH CENTER FOR COMBINATORICS

中国工业与应用数学学会图论组合分会
CSIAM ACTIVITY GROUP ON GRAPH THEORY AND COMBINATORICS WITH APPLICATIONS

陕西省工业与应用数学学会
SHAANXI SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS

中国 · 陕西 · 西安
China, Shaanxi, Xi'an

The 7th Xi'an International Workshop on Graph Theory and Combinatorics

Northwestern Polytechnical University

Xi'an, Shaanxi, P.R. China

June 23-June 28, 2023

Location

Xi'an Guangcheng Hotel, Xi'an, P.R. China
ZOOM Meeting ID: 302 412 8953, Passcode: xian

Program Committee

Chair: Gyula O.H. Katona, Xueliang Li

Members: Hajo Broersma, Gyula O.H. Katona, Binlong Li, Hao Li, Xueliang Li, You Lu, Miklós Simonovits, Ligong Wang, Jingtao Zang, Shenggui Zhang

Local Organizing Committee

Chair: Shenggui Zhang

General Secretary: Yandong Bai

Members: Yandong Bai, Lulu Gao, Binlong Li, Jing Li, Ruonan Li, Wei Li, Xiaogang Liu, You Lu, Ligong Wang, Jingtao Zang, Shenggui Zhang

Sponsors

Northwestern Polytechnical University
National Natural Science Foundation of China

Contact

Email: bai@nwpu.edu.cn

The 7th Xi'an International Workshop on Graph Theory and Combinatorics

Program

Location: Xi'an Guangcheng Hotel; Online ZOOM ID: 302 412 8953; Passcode: xian			
June 24, Saturday			
08:30-09:00	Opening Ceremony Chair: Shenggui Zhang		
Beijing Time	**Chair**	**Speaker**	**Title**
09:00-09:40	Xueliang Li	Gyula O. H. Katona	Combinatorial search problems
09:40-10:20		Dragan Stevanovic	Constructing examples and counterexamples in graph theory with reinforcement learning
10:20-10:40	Tea Break		
10:40-11:20	Wei Wang	Sanming Zhou	An overview of perfect codes in Cayley graphs (online)
11:20-12:00		Binzhou Xia	Card shuffle groups (online)
12:00-14:00	Lunch		
14:00-14:40	Shenggui Zhang	Miklós Simonovits	Stability methods in extremal combinatorics, and their role in proofs (online)
14:40-15:20		Gregory Gutin	Maximum digraph partitions (online)
15:20-15:40	Tea Break		
15:40-16:20	Ligong Wang	Shinya Fujita	Orientations for properly ordered coloring of vertex weighted graphs (online)
16:20-17:00		Yaping Mao	Gallai-Rado numbers and their multiplicities
17:00-17:40		Jingtao Zang	A rank of partitions with overline designated summands
18:00-20:00	Dinner		

Location: Xi'an Guangcheng Hotel; Online ZOOM ID: 302 412 8953; Passcode: xian			
June 25, Sunday			
08:30-09:10	Yandong Bai	Jie Han	Spanning trees in sparse expanders
09:10-09:50		Suil Oh	Eigenvalues and factors in graphs
09:50-10:10	Tea Break		
10:10-10:50	Xin Zhang	Bofeng Huo	Supereulerian regular matroids
10:50-11:30		Xia Zhang	The Turán number of bipartite degenerate graphs
11:30-12:00		Ruijuan Li	The oriented diameter of a bridgeless graph with the given path P_k
12:00-14:00	Lunch		
14:00-14:30	Fenjin Liu	Zhouningxin Wang	Modulo *k*-orientation and homomorphism to cycles
14:30-15:00		Jiangdong Ai	On Seymour's and Sullivan's Second-Neighbourhood Conjectures
15:00-15:30		Jian Wang	Intersecting families with covering number three
15:30-16:00		Bo Deng	Graph entropy based on strong coloring of uniform hypergraphs
16:00-16:20	Tea Break		
16:20-16:40	Ruonan Li	Jimeng Xiao	Turán numbers and anti-Ramsey numbers for short cycles
16:40-17:00		Shasha Zheng	Graphical regular representations of finite groups
17:00-17:20		Fangfang Wu	Properly colored and rainbow C_4's in edge-colored graphs (online)
17:20-17:40		Jing Wang	Fractional revival on Cayley graphs and semi-Cayley graphs
17:40-18:00	Closing Ceremony Chair: Shenggui Zhang		

Contents

Abstract

1 On Seymour's and Sullivan's second-neighbourhood conjectures

Jiangdong Ai
Nankai University, China
JiangdongAi95@gmail.com

In this talk, we will introduce a sufficient condition in terms of the number of transitive triangles for an oriented graph to satisfy Sullivan's conjecture. We also show that the two conjectures hold for some families of oriented split graphs, in particular, when the tournament is regular or almost regular.

2 Graph entropy based on strong coloring of uniform hypergraphs

Bo Deng
Qinghai Normal University, China
dengbo450@163.com

The classical graph entropy based on the vertex coloring proposed by Mowshowitz depends on a graph. In fact, a hypergraph, as a generalization of a graph, can express complex and high-order relations such that it is often used to model complex systems. Being different from the classical graph entropy, we extend this concept to a hypergraph. Then, we define the graph entropy based on the vertex strong coloring of a hypergraph. Moreover, some tightly upper and lower bounds of such graph entropies as well as the corresponding extremal hypergraphs are obtained.

3 Orientations for properly ordered coloring of vertex weighted graphs

Shinya Fujita
Yokohama City University, Japan
shinya.fujita.ph.d@gmail.com

Let (G, w) be a vertex weighted graph, where w is a weight function on $V(G)$ such that $w : V(G) \to \{1, 2, \ldots\}$. A vertex coloring $c : V(G) \to \{0, 1, 2, \ldots\}$ is *properly ordered coloring* (POC) of (G, w), if for every edge $e = uv$ in $E(G)$, $c(u) > c(v)$ if $w(u) > w(v)$ and $c(u) \neq c(v)$ if $w(u) = w(v)$. This notion was introduced in [S. Fujita, S. Kitaev, S. Sato, L-D. Tong: On properly ordered coloring of vertices in a vertex-weighted graph. *Order* 38: 515-525 (2021)].

In this talk, we consider giving an orientation on $E(G)$ such that the in-degrees of vertices of the resulting digraph D achieve a POC on (G, w) for the case where G is a tree T and $w : V \to \{1, 2\}$. Some recent results in this topic will be reviewed.

4 Maximum digraph partitions

Gregory Gutin
Royal Holloway University of London, UK
gutin@cs.rhul.ac.uk

This talk is based on two recent papers: (1) J. Ai, S. Gerke, G. Gutin, A. Yeo and Y. Zhou, Bounds on Maximum Weight Directed Cut, arXiv:2304.10202, (2) A. Deligkas, E. Eiben, G. Gutin, P.R. Neary and A. Yeo, Complexity of Efficient Outcomes in Binary-Action Polymatrix Games with Implications for Coordination Problems, Proc. IJCAI 2023, also arXiv:2305.07124.

In the first part of the talk, we'll discuss lower and upper bounds for Max Weighted Directed Cut. We'll compare our results with those obtained for the maximum size of a directed cut in unweighted digraphs. In particular, we see that a lower bound obtained by Alon, Bollobas, Gyafas, Lehel and Scott (J Graph Theory 55(1) (2007)) for unweighted acyclic digraphs can be extended to weighted digraphs with the maximum length of a cycle being bounded by a constant and the weight of every arc being at least one.

In the second part of the talk, we'll discuss complexity dichotomies (in P or NP-hard) proved for the new problem termed Maximum Weighted Digraph Partition (MWDP), which generalizes Maximum Weight Directed Cut and a number of other optimization problems on directed and undirected graphs. One of the dichotomies implies a complexity dichotomy for max welfare in general binary-action polymatrix games.

5 Supereulerian regular matroids

Bofeng Huo
Qinghai Normal University, China
huobofeng@qhnu.edu.cn

The concept of matroid partly originates from matrix. A regular matroid is of isomorphic to the vector matroid of a full unimodular matrix. A cycle of a matroid is a disjoint union of circuits. A matroid is supereulerian if it contains a spanning cycle. It is well known that every simple graph G with $n = |V(G)|$ and minimum degree $\delta(G) \geq \frac{n}{2}$ is Hamiltonian, thus supereulerian. To answer an open problem of Bauer in 1985, Catlin proved in [J. Graph Theory 12 (1988) 29-44] that for sufficiently large n, every 2-edge-connected simple graph G with $n = |V(G)|$ and minimum degree $\delta(G) \geq \frac{n}{5}$ is supereulerian. Lai proved in [J. Graph Theory 12 (1988) 11-15] that for sufficiently large n , every 2-edge-connected simple graph G with $n = |V(G)|$ and minimum degree $\delta(G) \geq \frac{n}{10}$ is supereulerian or its reduction is $K_{2,3}$. To find corresponding results like these conclusions in matroid is a research interest. In [European J. Combinatorics, 33 (2012), 1765-1776], it is shown that for any connected simple regular matroid M, if every cocircuit D of M satisfies $|D| \geq max\{\frac{r(M)-5}{5}, 6\}$, then M is supereulerian. We find that (i) For any real number c with $0 < c < 1$ there exists an integer $f(c)$ such that if every cocircuit D of a connected simple cographic matroid M satisfies $|D| \geq max\{c(r(M)+1), f(c)\}$, then M is supereulerian. (ii) Let M be a connected simple regular matroid. If every cocircuit D of M satisfies $|D| \geq max\{\frac{r(M)+1}{10}, 8\}$, then M is supereulerian. (ii) Let M be a connected simple regular matroid. If every cocircuit D of M satisfies $|D| \geq max\{\frac{r(M)+1}{15}, 9\}$and M's girth $g(M) \geq 4$, then M is supereulerian.

6 Spanning trees in sparse expanders

Jie Han
Beijing Institute of Technology, China
Han.jie@bit.edu.cn

We consider the spanning tree embedding problem in dense graphs without bipartite holes and sparse graphs. In 2005, Alon, Krivelevich and Sudakov asked for determining the best possible spectral gap forcing an (n, d, λ)-graph to be $T(n, \Delta)$-universal. In this talk, we introduce our recent work on this conjecture.

7 Combinatorial search problems

Gyula O. H. Katona
Hungarian Academy of Sciences, Hungary
katona.gyula.oh@renyi.hu

Suppose that in a certain n-element population, denoted by $[n]$, there is exactly one infected person. Obviously, one has to take a blood or saliva sample from every individual, therefore the expenses can be reduced only reducing the number of chemical tests. It was observed by Dorfman and Sterrett that it is not necessary to test every sample one by one, but one can form subsets of the samples, testing them together. This method is called "group testing" or "combinatorial search".

Mathematically the model is the following. Subsets $A \subset [n]$ can be tested if the unknown element x is in A or not. The unknown x is to be found on the basis of the answers. There are two main versions. When the next test set is chosen depending the previous answers, the search is called *adaptive*, while in the case when the family $A_1, A_2, \ldots, A_m$ of test sets is given in advance then the search is called *non-adaptive*. It is easy to see that, if any subset $A \subset [n]$ can be used as a test set then the search can be carried out in $\lceil \log n \rceil$ steps (even in the non-adaptive case). However in practical situation the test sets can be chosen only from a family $\mathcal{A}$ of subsets of $[n]$. Rényi suggested to find the minimum number of tests if $\mathcal{A}$ consist of all sets of size at most k when k is a relatively small integer. (This is a natural assumption in the case of finding the infected person.) Both the adaptive and the non-adaptive cases were solved by the author in 1966. The non-adaptive case can be formulated in the following way: find the minimum number of subsets of $[n]$ of at most k elements such that for any two distinct elements $x, y \in [n]$, there is a set separating them.

There are any variants of this model following the several practical applications.

One of the important variants is when the answer to the question "is $x \in A$?" can be incorrect. Because of a human error or some dirt spoils the chemical test. This is called *search in presence of a liar* or the *Rényi-Ulam game*. Here, again, one is looking for the unknown element $x \in [n]$ by asking questions of form "is $x \in A$?". However it is supposed that at most ℓ answers can be incorrect. Yet, the unknown element should be found without an error. The mathematical problem here is to find the minimum number of tests needed (in both, adaptive and non-adaptive cases). A good survey was written by Deppe in 2007.

In the cases above, in the traditional model of "search in presence of liar", the lies come independently. In some applications,however there might be connections among the test, the unknown x and the lie. For instance when x is the perpetrator in a criminal investigation then the answer to a question to the eyewitness can be incorrect depending on x. Say, if x is a friend of the witness. This situation can be described in the following way. Here instead of asking "is $x \in A$ or in its complement?" there is a certain subset L and the answer can be incorrect if x is in L. Otherwise it is surely correct. Mathematically in this case the following model is considered. There is exactly one unknown element in $[n]$. A question is a partition of $[n]$ into three classes: (A, L, B). If $x \in A$ then the answer is "yes" (or 1), if $x \in B$ then the answer is "no" (or 0), finally if $x \in L$ then the answer can be either "yes" or "no". In other words, if the answer "yes" is obtained then we know that $x \in A \cup L$ while in the case of "no" answer the conclusion is $x \in B \cup L$. The mathematical problem is to minimize the minimum number of questions under certain assumptions on the sizes of A, B and L. This problem has been solved under the condition $|L| \geq r$ by the author and Krisztián Tichler in previous papers for both the adaptive and non-adaptive cases.

In the present work we suggest to solve the problems under the conditions $|A| \leq a, |B| \leq b$. The adaptive case is completely solved. Let us make clear that the problem in the non-adaptive case is a problem of Extremal Set Theory. The minimum number of partitions (A, L, B) should be determined under the conditions $|A| \leq a, |B| \leq b$ and that for any two distinct elements $x, y \in [n]$ there is a partition strongly separating them that is one of the is in A, the other one is in B. We present asymptotic solutions. Among others the concept of *graph entropy* is used what was introduced by Körner.

8 The oriented diameter of a bridgeless graph with the given path P_k

Ruijuan Li
Shanxi University, China
ruijuanli@sxu.edu.cn

Let $G = (V, E)$ be a bridgeless undirected graph. The oriented diameter of G, denoted by $\overrightarrow{\text{diam}}(G)$, is the minimum diameter of any strongly connected orientation of G. Dankelmann, Guo and Surmacs [J. Graph Theory, 88 (2018), 5-17] showed that every bridgeless graph G of order n has an oriented diameter at most $n - \Delta + 3$, where Δ is the maximum degree of G. Let $N_G(H) = \bigcup_{v \in V(H)} N_G(v) \setminus V(H)$ for a subgraph H of G. For an edge e, they proved that G has an orientation of diameter at most $n - |N_G(e)| + 5$. In this report, we discuss how the above-mentioned upper bound to be generalized to $\overrightarrow{\text{diam}}(G) \leq n - |N_G(P_k)| + 2\left\lfloor \frac{k}{2} \right\rfloor + 3$ by substituting a vertex or an edge e by a given path P_k in G and provide the examples to show the sharpness of the upper bound. We also introduce the current research status and progress related to the topics.

9 Gallai-Rado numbers and their multiplicities

Yaping Mao
Qinghai Normal University, China
maoyaping@ymail.com

Ramsey theory on the integers covers a variety of topics from the field of Ramsey theory, limiting its focus to the set of integers. In this talk, we will introduce some short history of Rado numbers, the concept of Gallai-Rado numbers and Gallai-Ramsey multiplicity. It includes some recent work by us on this topic.

10 Eigenvalues and factors in graphs

Suil Oh
The State University of New York, South Korea
suil.oh@gmail.com

In this talk, we investigate spectral conditions for an (r-regular) graph to guarantee the existence of a certain factor.

11 Stability methods in extremal combinatorics, and their role in proofs

Miklós Simonovits
Alfréd Rényi Math Institute, Hungary
simonovits.miklos@renyi.hu

The notion of stability is very important in physics and in the theory of Differential Equations. Somewhat surprisingly, it became also an important notion in Discrete Mathematics

This lecture is part of a longer one which is based on a joint manuscript of Zoltán Füredi and myself.

In this lecture we shall describe one of the most powerful methods of Extremal Combinatorics, the Stability Method. The Erdős-Simonovits Stability theorem asserts that in case of ordinary graphs and Turn type extremal problems the extremal graphs and more generally, the almost extremal graphs have almost the same structure as in case of Turán's theorem. This theorem can be used in various settings, among others to prove sharp theorems, and also to prove results for extremal subgraphs of Random Graphs, like in the proof of the Babai-Simonovits-Spencer theorem. This area is related to several distinct branches of Discrete Mathematics. We shall discuss the stability approach in several distinct situation.

Among others we shall discuss the connection to the Regularity Lemma, and to the question how a result of Füredi helps to obtain a new proof of the Erdős-Simonovits stability theorem.

12 Constructing examples and counterexamples in graph theory with reinforcement learning

Dragan Stevanovic
Mathematical Institute of the Serbian Academy of Sciences and Arts, Serbia
dragance106@yahoo.com

Despite the tendency of mathematicians to present only finished, elegant results, experiment has always been an important part of mathematical discovery, serving either to lead a way towards new constructions or to refute ill-posed conjectures. We will discuss here the recently proposed new approach of Adam Wagner [arXiv:2104.14516 (2021)] of using an old reinforcement learning method to construct (counter)examples in graph theory. Besides explaining its inner workings, we will showcase here our more digestible re-implementation that is further sped up by combining Python's machine learning capabilities with the speed of computing (spectral) graph invariants in Java, and present counterexamples that have been found for a few conjectures along the way...

13 Intersecting families with covering number three

Jian Wang
Taiyuan University of Technology, China
wangjian01@tyut.edu.cn

We consider k-graphs on n vertices, that is, $\mathcal{F} \subset \binom{[n]}{k}$. A k-graph $\mathcal{F}$ is called intersecting if $F \cap F' \neq \emptyset$ for all $F, F' \in \mathcal{F}$. In the present paper we prove that for $k \geq 7$, $n \geq 2k$, any intersecting k-graph $\mathcal{F}$ with covering number at least three, satisfies $|\mathcal{F}| \leq \binom{n-1}{k-1} - \binom{n-k}{k-1} - \binom{n-k-1}{k-1} + \binom{n-2k}{k-1} + \binom{n-k-2}{k-3} + 3$, the best possible upper bound which was proved by Frankl subject to exponential constraints $n > n_0(k)$. Joint work with Peter Frankl.

14 Fractional revival on Cayley graphs and semi-Cayley graphs

Jing Wang
Northwestern Polytechnical University, China
wj66@mail.nwpu.edu.cn

Quantum state transfer in quantum networks is a very important research content for quantum communication protocols. Let G be a graph and A_G the adjacency matrix of G. The *transition matrix* of G relative to A_G is defined by $H_{A_G}(t) = \exp(\mathrm{i}tA_G)$. If u and v are distinct vertices in G, we say that G admits *fractional revival* from u to v if there is a time τ such that $|H_{A_G}(\tau)_{u,u}|^2 + |H_{A_G}(\tau)_{u,v}|^2 = 1$. In this talk, we will show what we have obtained on existence of fractional revival on Cayley graphs and semi-Cayley graphs over finite abelian groups. This is a joint work with Ligong Wang and Xiaogang Liu.

15 Modulo k-orientation and homomorphism to cycles

Zhouningxin Wang
Nankai University, China
wangzhou@nankai.edu.cn

It is well-known that a graph admits a circular $(2k+1)/k$-flow if and only if it admits a modulo $(2k+1)$-orientation. When restricted to planar graphs, a plane graph admits a modulo $(2k+1)$-orientation if and only if its dual plane graph G^* admits a homomorphism to an odd cycle of length $2k+1$. In this talk, generalizing these notions to signed graphs, we shall explore the relation between modulo k-orientations on signed graphs and homomorphisms to signed cycles. In particular, we will show every $(6k-2)$-edge-connected Eulerian signed graph admits a modulo $2k$-orientation, and every signed bipartite planar graph of negative girth at least $6k-2$ admits a homomorphism to a negative even cycle of length $2k$. This is joint work with Jiaao Li, Reza Naserasr, and Xuding Zhu.

16 Properly colored and rainbow C_4's in edge-colored graphs

Fangfang Wu
Northwestern Polytechnical University, China
wufangfang2017@mail.nwpu.edu.cn

We present new sharp sufficient conditions for the existence of properly colored and rainbow C_4's in edge-colored graphs. Our first results deal with sharp color neighborhood conditions for the existence of properly colored C_4's in edge-colored complete graphs and complete bipartite graphs, respectively. Next, we characterize the extremal graphs for an anti-Ramsey number result due to Alon on the existence of rainbow C_4's in edge-colored complete graphs. We also generalize Alon's result from complete to general edge-colored graphs. Finally, we derive a structural property regarding the extremal graphs for a bipartite counterpart of Alon's result due to Axenovich, Jiang and Kündgen on the existence of rainbow C_4's in edge-colored complete bipartite graphs. We also generalize their result from complete to general bipartite edge-colored graphs.

17 Card shuffle groups

Binzhou Xia
The University of Melbourne, Australia
binzhoux@unimelb.edu.au

Shuffling a deck of cards is often encountered in card tricks. There are a number of questions that may be of concern, such as how a shuffle changes the order of the deck, and how many different orderings can be obtained by shuffling the deck repeatedly. The latter question is to determine the permutation group, called the shuffle group, generated by all the considered shuffles. More precisely, for positive integers k and n, the shuffle group $G_{k,kn}$ is generated by the $k!$ permutations of a deck of kn cards performed by cutting the deck into k piles with n cards in each pile, and then perfectly interleaving these cards following certain order of the k piles. The shuffle group $G_{2,2n}$ was completely determined by Diaconis, Graham and Kantor in 1983, and a conjectural classification has been made in the literature for the general $G_{k,kn}$. In this talk, we confirm this conjecture in the case when $k \geq 4$ or k does not divide n. For the remaining case, we reduce the proof of the conjecture to that of the 2-transitivity of the shuffle group. This is joint work with Zhishuo Zhang and Wenying Zhu.

18 Turán numbers and anti-Ramsey numbers for short cycles

Jimeng Xiao
Southern University of Science and Technology, China
xiaojm@sustech.edu.cn

We call a 4-cycle in K_{n_1,n_2,n_3} multipartite, denoted by C_4^{multi}, if it contains at least one vertex in each part of K_{n_1,n_2,n_3}. The Turán number $\text{ex}(K_{n_1,n_2,n_3}, C_4^{\text{multi}})$ $\big($respectively, $\text{ex}(K_{n_1,n_2,n_3}, \{C_3, C_4^{\text{multi}}\})\big)$ is the maximum number of edges in a graph $G \subseteq K_{n_1,n_2,n_3}$ such that G contains no C_4^{multi} $\big($respectively, G contains neither C_3 nor $C_4^{\text{multi}}\big)$. We call an edge-colored C_4^{multi} rainbow if all four edges of it have different colors. The anti-Ramsey number $\text{ar}(K_{n_1,n_2,n_3}, C_4^{\text{multi}})$ is the maximum number of colors in an edge-colored K_{n_1,n_2,n_3} with no rainbow C_4^{multi}. In this paper, we determine that $\text{ex}(K_{n_1,n_2,n_3}, C_4^{\text{multi}}) = n_1n_2 + 2n_3$ and $\text{ar}(K_{n_1,n_2,n_3}, C_4^{\text{multi}}) = \text{ex}(K_{n_1,n_2,n_3}, \{C_3, C_4^{\text{multi}}\}) + 1 = n_1n_2 + n_3 + 1$, where $n_1 \geq n_2 \geq n_3 \geq 1$.

19 A rank of partitions with overline designated summands

Wenston J.T. Zang
Northwestern Polytechnical University, China
zang@nwpu.edu.cn

Andrews, Lewis and Lovejoy introduced the partition function $PD(n)$ as the number of partitions of n with designated summands. Lin studied a partition function $PD_t(n)$ which counts the number of tagged parts over all the partitions of n with designated summand. He proved that $PD_t(3n+2)$ is divisible by 3. In this talk, we will first introduce a combinatorial structure named partitions with overline designated summands, which counted by $PD_t(n)$. We then define a generalized rank on this structure, which provide a combinatorial interpretation of the congruence of $PD_t(3n+2)$.(This is joint work with Robert X.J. Hao and Erin Y.Y. Shen)

20 The Turán number of bipartite degenerate graphs

Xia Zhang
Shandong Normal University, China
xiazhang@sdnu.edu.cn

In 1966, Erdős put forward a conjecture that the Turan number of every bipartite r-degenerate graph H is $ex(n,H) = O(n^{2-\frac{1}{r}})$. In this talk, we define a class of r-degenerate bipartite graph $F(r,l,m)$ and show that $ex(n,F(r,l,m)) = O(n^{2-\frac{1}{r}})$. This result extends the ones of Grzesik, Janzer and Nagy in 2019 on the Turán number of r-degenerate blow-ups of trees [The Turán number of blow-ups of trees. J. Comb. Theory, Ser. B 156 (2019): 299-309.].

21 Graphical regular representations of finite groups

Shasha Zheng
The University of Melbourne, Australia
zhesz@student.unimelb.edu.au

In this talk we are concerned with the automorphisms of Cayley graphs. Here are some natural questions: What kind of automorphism group of a Cayley graph is 'typical'; what kind of Cayley graph is 'common'? Viewing that 'symmetry is rare', a rough guess for the first question would be the groups that are 'as small as possible' in some sense, and one may guess for the second question that the Cayley graphs having the 'smallest' full automorphism groups would be the most common ones. We estimate the number of graphical regular representations of a given group with large enough order and show that almost all finite Cayley graphs have full automorphism groups 'as small as possible'. This confirms a conjecture of Babai-Godsil-Imrich-Lovasz. (This is joint work with Binzhou Xia.)

22 An overview of perfect codes in Cayley graphs

Sanming Zhou
The University of Melbourne, Australia
sanming@unimelb.edu.au

For a graph Γ and a positive integer e, a perfect e-code in Γ is a subset C of $V(\Gamma)$ such that the closed e-neighbourhoods of the vertices in C form a partition of $V(\Gamma)$. Given a finite group G and an inverse-closed subset S of G excluding the identity element, the Cayley graph $\mathrm{Cay}(G, S)$ is the graph with vertex set G such that $x, y \in G$ are adjacent if and only if $yx^{-1} \in S$. Perfect codes in Cayley graphs can be considered as generalisations of perfect codes in classical coding theory, and perfect 1-codes in Cayley graphs are closely related to tilings of the underlying groups. I will give an overview of perfect codes in Cayley graphs with a focus on perfect 1-codes.

通讯录

序号	姓名	单位	Email 地址
1	艾江东	南开大学	JiangdongAi95@gmail.com
2	安玉雨	西北工业大学	ayy9838@163.com
3	白旭清	西安电子科技大学	baixuqing@xidian.edu.cn
4	白延东	西北工业大学	bai@nwpu.edu.cn
5	白育航	西北工业大学	yhbai@mail.nwpu.edu.cn
6	柴艺瑞	西北工业大学	yiruichai@163.com
7	常彩冰	华南师范大学	changcaibing2018@163.com
8	邓 波	青海师范大学	dengbo450@163.com
9	董 博	西北工业大学	1258856944@qq.com
10	段存香	太原理工大学	cxduanmath@163.com
11	段梦宇	西北工业大学	myduan@mail.nwpu.edu.cn
12	房宜宾	南开大学	yibin_fang@163.com
13	Shinya Fujita	横滨市立大学	shinya.fujita.ph.d@gmail.com
14	郜璐璐	西北工业大学	llgao@nwpu.edu.cn
15	高闪闪	西北工业大学	gaoshsh@mail.nwpu.edu.cn
16	Gregory Gutin	伦敦大学皇家霍洛威学院	gutin@cs.rhul.ac.uk
17	郭曙光	盐城师范学院	ychgsg@163.com
18	韩 杰	北京理工大学	Han.jie@bit.edu.cn
19	韩婷婷	西北工业大学	tinghan@mail.nwpu.edu.cn
20	胡 杰	南开大学	hujie@nankai.edu.cn
21	黄苏闽	厦门大学	sumin2019@sina.com
22	火博丰	青海师范大学	huobofeng@qhnu.edu.cn
23	Quaid Iqbal	南开大学	quaidiqbal@nankai.edu.cn
24	嘉文培	西北工业大学	wenpei.jia@foxmail.com
25	蒋 明	西北工业大学	mjiang@mail.nwpu.edu.cn
26	Gyula O. H. Katona	匈牙利科学院	katona.gyula.oh@renyi.hu
27	兰静芬	西安电子科技大学	jflan@xidian.edu.cn

28	雷宝明	西北工业大学	3513839237@qq.com
29	李 碧	西安电子科技大学	libi@xidian.edu.cn
30	李斌龙	西北工业大学	binlongli@nwpu.edu.cn
31	李 好	西北工业大学	1817407138@qq.com
32	李 静	西北工业大学	jingli@nwpu.edu.cn
33	李瑞娟	山西大学	ruijuanli@sxu.edu.cn
34	李若楠	西北工业大学	rnli@nwpu.edu.cn
35	李 巍	西北工业大学	liw@nwpu.edu.cn
36	李学良	南开大学	lxl@nankai.edu.cn
37	李雪萌	西北工业大学	lixuemeng12279@163.com
38	刘 聪	西北工业大学	2919829147@qq.com
39	刘奋进	长安大学	fenjinliu@163.com
40	刘晓刚	西北工业大学	xiaogliu@nwpu.edu.cn
41	刘 欣	西北工业大学	liuxin426@mail.nwpu.edu.cn
42	刘雨香	西北工业大学	yxliumath@163.com
43	陆茹慧	西北工业大学	lurh@mail.nwpu.edu.cn
44	陆 由	西北工业大学	luyou@nwpu.edu.cn
45	马嘉豪	西北工业大学	jiahao_ma@foxmail.com
46	马婷妍	西北工业大学	matingylw@163.com
47	毛亚平	青海师范大学	maoyaping@ymail.com
48	闵 劲	西北工业大学	jinmin@mail.nwpu.edu.cn
49	Suil Oh	纽约州立大学（韩国）	suil.oh@gmail.com
50	平 超	西北工业大学	pingchao@mail.nwpu.edu.cn
51	祁 兰	榆林学院	qilan@yulinu.edu.cn
52	钱建国	厦门大学	jgqian@xmu.edu.cn
53	阮 轩	西北工业大学	rx132142@163.com
54	桑子晴	西北工业大学	ziqing_sang@163.com
55	Miklós Simonovits	匈牙利科学院	simonovits.miklos@renyi.hu
56	宋筱頔	西北工业大学	songxd@mail.nwpu.edu.cn
57	Dragan Stevanovic	塞尔维亚科学院	dragance106@yahoo.com

58	苏雪丽	西北工业大学	sxuelisu@163.com
59	覃忠美	长安大学	qinzhm@chd.edu.cn
60	田德谦	西北工业大学	tiandeqian@mail.nwpu.edu.cn
61	万鹏飞	榆林学院	pengfeiwan@yulinu.edu.cn
62	王 红	南开大学	wanghong@nankai.edu.cn
63	王惠真	西北工业大学	whz_mail@mail.nwpu.edu.cn
64	王 健	太原理工大学	wangjian01@tyut.edu.cn
65	王 静	西北工业大学	wj66@mail.nwpu.edu.cn
66	王力工	西北工业大学	lgwang@nwpu.edu.cn
67	王 卫	西安交通大学	wang_weiw@163.com
68	王玉浩	长安大学	wyh_991103@163.com
69	王周宁馨	南开大学	wangzhou@nankai.edu.cn
70	魏改过	西北工业大学	wgg2021@mail.nwpu.edu.cn
71	吴方方	西北工业大学	wufangfang2017@mail.nwpu.edu.cn
72	郗方旭	西北工业大学	fxximath@163.com
73	席维鸽	西北农林科技大学	xiyanxwg@163.com
74	夏彬绉	墨尔本大学	binzhoux@unimelb.edu.au
75	肖继孟	南方科技大学	xiaojm@sustech.edu.cn
76	肖 鹏	陕西科技大学	17263249@qq.com
77	杨 晨	青海师范大学	1379929632@qq.com
78	臧经涛	西北工业大学	zang@nwpu.edu.cn
79	张巧卫	榆林学院	zhangqiaowei@yulinu.edu.cn
80	张胜贵	西北工业大学	sgzhang@nwpu.edu.cn
81	张 霞	山东师范大学	xiazhang@sdnu.edu.cn
82	张 欣	西安电子科技大学	xzhang@xidian.edu.cn
83	郑莎莎	墨尔本大学	zhesz@student.unimelb.edu.au
84	周三明	墨尔本大学	sanming@unimelb.edu.au
85	周雨薇	西北工业大学	yuweizhoumath@163.com

Address List

No.	Name	Unit	Email
1	Jiangdong Ai	Nankai University	JiangdongAi95@gmail.com
2	Yuyu An	Northwestern Polytechnical University	ayy9838@163.com
3	Xuqing Bai	Xidian University	baixuqing@xidian.edu.cn
4	Yandong Bai	Northwestern Polytechnical University	bai@nwpu.edu.cn
5	Yuhang Bai	Northwestern Polytechnical University	yhbai@mail.nwpu.edu.cn
6	Yirui Chai	Northwestern Polytechnical University	yiruichai@163.com
7	Caibing Chang	South China Normal University	changcaibing2018@163.com
8	Bo Deng	Qinghai Normal University	dengbo450@163.com
9	Bo Dong	Northwestern Polytechnical University	1258856944@qq.com
10	Cunxiang Duan	Taiyuan University of Technology	cxduanmath@163.com
11	Mengyu Duan	Northwestern Polytechnical University	myduan@mail.nwpu.edu.cn
12	Yibin Fang	Nankai University	yibin_fang@163.com
13	Shinya Fujita	Yokohama City University	shinya.fujita.ph.d@gmail.com
14	Shanshan Gao	Northwestern Polytechnical University	gaoshsh@mail.nwpu.edu.cn
15	Lulu Gao	Northwestern Polytechnical University	llgao@nwpu.edu.cn
16	Gregory Gutin	Royal Holloway, University of London	gutin@cs.rhul.ac.uk
17	Shuguang Guo	Yancheng Normal College	ychgsg@163.com
18	Jie Han	Beijing Institute of	Han.jie@bit.edu.cn

		Technology	
19	Tingting Han	Northwestern Polytechnical University	tinghan@mail.nwpu.edu.cn
20	Jie Hu	Nankai University	hujie@nankai.edu.cn
21	Sumin Huang	Xiamen University	sumin2019@sina.com
22	Bofeng Huo	Qinghai Normal University	huobofeng@qhnu.edu.cn
23	Quaid Iqbal	Nankai University	quaidiqbal@nankai.edu.cn
24	Wenpei Jia	Northwestern Polytechnical University	wenpei.jia@foxmail.com
25	Ming Jiang	Northwestern Polytechnical University	mjiang@mail.nwpu.edu.cn
26	Gyula O. H. Katona	Hungarian Academy of Sciences	katona.gyula.oh@renyi.hu
27	Jingfen Lan	Xidian University	jflan@xidian.edu.cn
28	Baoming Lei	Northwestern Polytechnical University	3513839237@qq.com
29	Jing Li	Northwestern Polytechnical University	jingli@nwpu.edu.cn
30	Binlong Li	Northwestern Polytechnical University	binlongli@nwpu.edu.cn
31	Hao Li	Northwestern Polytechnical University	1817407138@qq.com
32	Bi Li	Xidian University	libi@xidian.edu.cn
33	Ruijuan Li	Shanxi University	ruijuanli@sxu.edu.cn
34	Ruonan Li	Northwestern Polytechnical University	rnli@nwpu.edu.cn
35	Wei Li	Northwestern Polytechnical University	liw@nwpu.edu.cn
36	Xueliang Li	Nankai University	lxl@nankai.edu.cn
37	Xuemeng Li	Northwestern Polytechnical University	lixuemeng12279@163.com

38	Cong Liu	Northwestern Polytechnical University	2919829147@qq.com
39	Fenjin Liu	Chang 'an University	fenjinliu@163.com
40	Xiaogang Liu	Northwestern Polytechnical University	xiaogliu@nwpu.edu.cn
41	Xin Liu	Northwestern Polytechnical University	liuxin426@mail.nwpu.edu.cn
42	Yuxiang Liu	Northwestern Polytechnical University	yxliumath@163.com
43	Ruhui Lu	Northwestern Polytechnical University	lurh@mail.nwpu.edu.cn
44	You Lu	Northwestern Polytechnical University	luyou@nwpu.edu.cn
45	Jiahao Ma	Northwestern Polytechnical University	jiahao_ma@foxmail.com
46	Tingyan Ma	Northwestern Polytechnical University	matingylw@163.com
47	Yaping Mao	Qinghai Normal University	maoyaping@ymail.com
48	Jin Min	Northwestern Polytechnical University	jinmin@mail.nwpu.edu.cn
49	Suil Oh	State University of New York (Korea)	suil.oh@gmail.com
50	Chao Ping	Northwestern Polytechnical University	pingchao@mail.nwpu.edu.cn
51	Lan Qi	Yulin University	qilan@yulinu.edu.cn
52	Jianguo Qian	Xiamen University	jgqian@xmu.edu.cn
53	Xuan Ruan	Northwestern Polytechnical University	rx132142@163.com
54	Ziqing Sang	Northwestern Polytechnical University	ziqing_sang@163.com
55	Miklós Simonovits	Hungarian Academy of	simonovits.miklos@renyi.hu

		Sciences	
56	Xiaodi Song	Northwestern Polytechnical University	songxd@mail.nwpu.edu.cn
57	Dragan Stevanovic	Serbian Academy of Sciences	dragance106@yahoo.com
58	Xueli Su	Northwestern Polytechnical University	sxuelisu@163.com
59	Zhongmei Tan	Chang 'an University	qinzhm@chd.edu.cn
60	Deqian Tian	Northwestern Polytechnical University	tiandeqian@mail.nwpu.edu.cn
61	Pengfei Wan	Yulin University	pengfeiwan@yulinu.edu.cn
62	Hong Wang	Nankai University	wanghong@nankai.edu.cn
63	Huizhen Wang	Northwestern Polytechnical University	whz_mail@mail.nwpu.edu.cn
64	Jian Wang	Taiyuan University of Technology	wangjian01@tyut.edu.cn
65	Jing Wang	Northwestern Polytechnical University	wj66@mail.nwpu.edu.cn
66	Ligong Wang	Northwestern Polytechnical University	lgwang@nwpu.edu.cn
67	Wei Wang	Xi 'an Jiaotong University	wang_weiw@163.com
68	Yuhao Wang	Chang'an University	wyh_991103@163.com
69	Zhouningxin Wang	Nankai University	wangzhou@nankai.edu.cn
70	Gaiguo Wei	Northwestern Polytechnical University	wgg2021@mail.nwpu.edu.cn
71	Fangfang Wu	Northwestern Polytechnical University	wufangfang2017@mail.nwpu.edu.cn
72	Fangxu Xi	Northwestern Polytechnical University	fxximath@163.com
73	Weige Xi	Northwest Agriculture and Forestry University	xiyanxwg@163.com
74	Binzhou Xia	The University of Melbourne	binzhoux@unimelb.edu.au

75	Jimeng Xiao	Southern University of Science and Technology	xiaojm@sustech.edu.cn
76	Peng Xiao	Shaanxi University of Science and Technology	17263249@qq.com
77	Chen Yang	Qinghai Normal University	1379929632@qq.com
78	Jingtao Zang	Northwestern Polytechnical University	zang@nwpu.edu.cn
79	Qiaowei Zhang	Yulin University	zhangqiaowei@yulinu.edu.cn
80	Shenggui Zhang	Northwestern Polytechnical University	sgzhang@nwpu.edu.cn
81	Xia Zhang	Shandong Normal University	xiazhang@sdnu.edu.cn
82	Xin Zhang	Xidian University	xzhang@xidian.edu.cn
83	Shasha Zheng	The University of Melbourne	zhesz@student.unimelb.edu.au
84	Sanming Zhou	The University of Melbourne	sanming@unimelb.edu.au
85	Yuwei Zhou	Northwestern Polytechnical University	yuweizhoumath@163.com

公为天下 报效祖国

诚实守信 襟怀坦荡

勇猛精进 敢为人先

毅然果决 坚韧不拔

Northwestern Polytechnical University

June 23-28, 2023

Xi'an, Shaanxi, China