第三届图与有向图的结构与应用研讨会

为促进图与有向图领域的学术交流与合作，探讨该领域的最新研究进展核心问题及应用前景，进一步凝聚国内外相关领域研究者的力量，推动学科高质量发展，特举办“第三届图与有向图的结构与应用研讨会”。

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图与有向图的结构与应用研讨会 组织委员会

2026 年 2 月 5 日

第三届有向图的结构与应用研讨会			
4 月 3 日（地点：嘉园一楼）			
14:00-21:00	**报 到**		
17:30-19:30	**晚 餐**		
4 月 4 日（会议地点：陈省身数学研究所 216 会议室）			
时 间	**报告人**	**报 告 题 目**	**主持人**
8:20-8:30	**开幕式**		
8:30-9:00	**陈 彬**	**New results on the traceability conjecture**	**艾江东**
9:00-9:30	**邓科财**	**On the 1-2 conjecture**	**徐子翔**
9:30-10:00	**何 臻**	**The connected bipartite Turán problem for long cycles and paths**	**刘建兵**
10:00-10:30	**合 影、茶 歇**		
10:30-11:00	**刘乐乐**	**Maximum spectral sum of graphs**	**王 烨**
11:00-11:30	**刘瑞芳**	**Turán number of books in non-bipartite graphs**	**黄雪毅**
11:30-12:00	**卢安晞**	**A characterization of graphs with no $K_{3,4}$ minor**	**顾 冉**
12:00-14:00	**午 餐，地点：嘉园一楼**		
4 月 4 日（会议地点：陈省身数学研究所 214 会议室）			
时 间	**报告人**	**报 告 题 目**	**主持人**
14:30-15:00	**陶裘祯宇**	**Large flames in rooted acyclic digraphs without backward-infinite paths**	**王艺桥**
15:00-15:30	**汪 彦**	**Nearly tight bound for rainbow clique subdivisions in properly edge-colored graphs and applications**	**赵天骁**
15:30-16:00	**王志文**	**Upper bounds of the second largest eigenvalue of graphs**	**陈 明**

16:00-16:20	**茶　歇**		
16:20-16:50	薛益赛	**A directed Alon-Sudakov theorem for blow-ups of transitive tournaments**	岳　军
16:50-17:20	颜　棋	**A vertex polynomial invariant for embedded graphs**	兰永新
17:20-17:50	严子龙	**What parameters guarantee structural stability of graphs forbidding C_{2k+1}**	高志鹏
18:00-19:30	**晚　餐**		

4 月 5 日（会议地点：陈省身数学研究所 216 会议室）			
时　间	报 告 人	报 告 题 目	主持人
8:30-9:00	杨东雷	**Packing 4-cliques in edge-weighted graphs**	胡　杰
9:00-9:30	尹富纲	**New constructions of vertex-primitive 2-arc-transitive digraphs**	张俊雪
9:30-10:00	袁龙图	**Anti-ramsey numbers for cancellative configurations in uniform hypergraphs**	连晓盼
10:00-10:20	**茶　歇**		
10:20-10:50	曾庆厚	**Paths with equal-degree endpoints**	张力文
10:50-11:20	赵　达	**Attempts on Haemers conjecture**	吉一喆
11:20-11:50	周亚聪	**Minimum feedback arc set and feedback arc set decompositions**	郁常清
12:00-14:00	**午 餐，地点：嘉园一楼**		

4 月 5 日（会议地点：组合数学中心四楼多功能厅）	
14:00-18:00	**自由讨论**
18:00-19:30	**晚　餐**

New Results on the Traceability Conjecture

Bin Chen

Fuzhou University

A digraph is traceable if it contains a hamiltonian directed path. A digraph on $n \geq k$ vertices is k-traceable if every of its induced subdigraph on k vertices is traceable. An oriented graph is a digraph excluding directed cycles of length two. In 2008, van Aardt et al. conjectured that for any $k \geq 2$, every k-traceable oriented graph on at least $2k-1$ vertices is traceable.

In this talk, we will provide several new results on the mentioned conjecture, and give more related results.

报告人简介：陈彬，博士毕业于福州大学，导师是常安教授；曾于合肥国家实验室从事博士后研究工作，合作导师是侯新民教授；现为福州大学数学与统计学院讲师，主要研究有向图中若干结构问题与极值问题，在 J. Graph Theory, Electron. J. Combin, Discrete Math. 等期刊发表论文 10 余篇。

On the 1-2 Conjecture

Kecai Deng

Huaqiao University

The 1-2 conjecture states that every simple graph admits a proper $\{1,2\}$-total weighting. Its list version, the $(2,2)$-choosability conjecture, asserts that for any list assignment which assigns to each vertex and edge a set of two real numbers, there exists a proper total weighting consistent with the lists. In our recent work, we verify the case in which, the difference between the two numbers in each list is the same. This not only confirms the 1-2 conjecture, but also provides supporting evidence for the $(2,2)$-choosability conjecture.

报告人简介：邓科财，厦门大学数学科学学院本科、硕士、博士毕业，师从钱建国教授。现任华侨大学数学科学学院副教授、硕士生导师。主要研究方向为图的染色、计数、极值问题等，已发表学术论文 24 篇，包括《J. Comb. Theory, Ser. B》、《Discrete Math.》等期刊。主持国家自然科学基金青年项目，福建省自然科学基金，中央高校基本科研业务费各 1 项。担任福建省运筹学会理事。

The Connected Bipartite Turán Problem for Long Cycles and Paths

Zhen He

Beijing Jiaotong University

Caro, Patkós, and Tuza initiated a systematic study of the bipartite Turán number for trees, and in particular asked for the extremal number of edges in connected bipartite graphs with prescribed color-class sizes that contain no paths of given lengths.

In this talk, we determine these numbers exactly and describe all corresponding extremal configurations. Our approach first establishes a more general result for long cycles: we determine the exact structure of all 2-connected bipartite graphs with no cycle of length at least a given constant.The proof combines Kopylov's method for long cycles with a strengthened version of Jackson's classical lemma, in which every extremal configuration is characterized.

This is joint work with Nika Salia and Xiutao Zhu.

报告人简介：何臻，北京交通大学讲师，2023 年博士毕业于清华大学。主要研究图的极值问题，在 JCTB，SIDMA，E-JC 等期刊发表论文 20 余篇，主持国家青年基金一项，北京市青年基金一项。

Maximum Spectral Sum of Graphs

Lele Liu

Anhui University

For a graph G of order n, the spectral sum of G is defined to be the sum $\lambda_1(G)+\lambda_2(G)$, where $\lambda_1(G)$ (resp. $\lambda_2(G)$) is the largest (resp. second largest) adjacency eigenvalue of G. Ebrahimi, Mohar, Nikiforov and Ahmady (2008) conjectured that the spectral sum

$$\lambda_1(G)+\lambda_2(G)\leq\frac{8}{7}n$$

for any graph G. We prove this conjecture by combining tools from the theory of graph limits and convex geometry.

报告人简介：刘乐乐，副教授，2019 年博士毕业于上海大学，导师是康丽英教授。目前在安徽大学工作，主要从事谱图理论的研究。在“Journalof Combinatorial Theory, Series B”，“SIAM Journal on Discrete Mathematics”，“Journal of Graph Theory”，“European Journal of Combinatorics”等杂志上发表论文 30 余篇。

Turán Number of Books in Non-bipartite Graphs

Ruifang Liu

Zhengzhou University

Let $\mathrm{ex}(n,H)$ be the Turán number of H for a given graph H. A graph is color-critical if it contains an edge whose removal reduces its chromatic number. Simonovits' chromatic critical edge theorem states that if H is color-critical with $\chi(H)=k+1$, then there exists an $n_0(H)$ such that $\mathrm{ex}(n,H)=e(T_{n,k})$ and the Turán graph $T_{n,k}$ is the only extremal graph provided $n\geq n_0(H)$. A book graph B_{r+1} is a set of $r+1$ triangles with a common edge, where $r\geq 0$ is an integer. Note that B_{r+1} is a color-critical graph with $\chi(B_{r+1})=3$. Simonovits' theorem implies that $T_{n,2}$ is the only extremal graph for B_{r+1}-free graphs of sufficiently large order n. Furthermore, Edwards and independently Khadžiivanov and Nikiforov completely confirmed Erdős' booksize conjecture and obtained that $\mathrm{ex}(n,B_{r+1})=e(T_{n,2})$ for $n\geq n_0(B_{r+1})=6r$. Note that the extremal graph $T_{n,2}$ is bipartite. Motivated by the above elegant results, we in this paper focus on the Turán problem of non-bipartite B_{r+1}-free graphs of order n. For $r=0$, Erdős proved a nice result: If G is a non-bipartite triangle-free graph on n vertices, then $e(G)\leq\lfloor\frac{(n-1)^2}{4}\rfloor+1$. For general $r\geq 1$, we determine the exact value of Turán number of B_{r+1} in non-bipartite graphs and characterize all extremal graphs provided n is sufficiently large.

报告人简介：刘瑞芳，郑州大学数学与统计学院教授，博士生导师，河南省高层次人才。中原基础研究领军人才，河南省杰青，河南省教育厅学术技术带头人。中国工业与应用数学学会图论组合及应用专业委员会常务委员。主要从事代数图论与极值图论的研究工作。在《European Journal of Combinatorics》、《Advances in Applied Mathematics》、《Electronic Journal of Combinatorics》、《Journal of Algebraic Combinatorics》等图论组合主流期刊发表 SCI 学术论文 70 余篇。主持国家自然科学基金项目多项，中原英才计划 1 项。曾在美国西弗吉尼亚大学数学系和香港浸会大学数学系进行学术访问。

A Characterization of Graphs with No $K_{3,4}$ Minor

On-Hei Solomon Lo

Tongji University

Wagner established a characterization of graphs with no $K_{3,3}$ minor in 1937. Following this line of research, we provide a characterization of graphs with no $K_{3,4}$ minor. As a consequence, we prove that every 4-connected non-planar graph with at least seven vertices and minimum degree at least five contains both $K_{3,4}$ and K_6^- as minors, thereby proving a conjecture of Kawarabayashi and Maharry in a stronger form.

报告人简介：卢安晞，同济大学数学科学学院特聘研究员，毕业于德国伊尔梅瑙工业大学。主要研究方向为结构图论，在 J. reine angew. Math.、J. Combin. Theory Ser. B、Math. Comp. 等期刊发表论文二十篇。曾获得中国博士后科学基金及日本学术振兴会博士后科研基金。

Large Flames in Rooted Acyclic Digraphs without Backward-infinite Path

Qiuzhenyu Tao

East China University of Science and Technology

An r-rooted digraph is a flame if for each non-root vertex v, there is a set of edge-disjoint directed paths from r to v that covers all ingoing edges of v. The study of flames was initiated by Lovász, who showed that in a finite rooted digraph, the edge-minimal subgraphs that preserve all local edge-connectivities from the root are always flames. It is known that the edge sets of the flame subgraphs of any finite rooted digraph form a greedoid. Szeszlér showed recently that if the digraph is acyclic, then the bases of this greedoid are the bases of a matroid.

We show that a suitable formulation of Szeszlér's theorem is valid for infinite digraphs under the additional assumption that there are no backward-infinite directed paths (which assumption is indeed essential). We also prove that the "correct" infinite generalisation of Lovász's theorem also holds for this class of digraphs.

报告人简介：陶裘祯宇，现为华东理工大学讲师。2022 年博士毕业于南开大学组合数学中心，博士导师史永堂教授。曾在德国汉堡大学数学系离散数学小组作博士后，主要研究方向为有向图与无限图的结构问题，在 JGT 等期刊发表多篇论文。

Nearly Tight Bound for Rainbow Clique Subdivisions in properly Edge-colored Graphs and Applications

Yan Wang

Shanghai Jiaotong University

An edge-colored graph is said to be rainbow if all its edges have distinct colors. In this paper, we study the rainbow analogue of a fundamental result of Mader [*Math. Ann.* **174** (1967), 265–268] on the existence of subdivisions in graphs with large average degree. This is part of the study of rainbow analogues of classical Turán problems, a framework systematically introduced by Keevash, Mubayi, Sudakov and Verstraëte [*Combin. Probab. Comput.* **16** (2007), 109–126]. We prove that every properly edge-colored graph on n vertices with average degree at least $t^2(\log n)^{1+o(1)}$ contains a rainbow subdivision of K_t. When t is a constant, this bound is tight up to the $o(1)$ term. So it essentially resolves a question raised by Jiang, Methuku and Yepremyan [*European J. Combin.* **110** (2023), 103675] on rainbow clique subdivisions, and also implies a result of Alon, Bucić, Sauermann, Zakharov and Zamir [*Proc. Lond. Math. Soc.* **130** (2025), e70044] on rainbow cycles. In addition, we present several applications of our result to problems in additive combinatorics, number theory and coding theory. This is joint work with Peiru Kuang.

报告人简介：汪彦，上海交通大学数学科学学院副教授。2017 年博士毕业于美国佐治亚理工学院，师从国际著名图论专家郁星星教授。他获得上海市海外高层次人才计划，并主持国家重点研发计划青年科学家项目，主要研究方向为图论，发表多篇高水平论文，与郁星星教授等合作证明了近四十年的 Kelmans-Seymour 猜想等。

Upper Bounds of the Second Largest Eigenvalue of Graphs

Zhiwen Wang

East China University of Science and Technology

Let $\lambda_i(G)$ denote the i-th largest eigenvalue of adjacency matrix of a graph G. Gerschgorin's Theorem indicates $\lambda_1(G)$ belongs to the largest disk, i.e., $\lambda_1(G) \leq \Delta_1(G)$, where $\Delta_i(G)$ is the i-th largest degree of G. We show that $\lambda_2(G)$ lies in the second largest disk. That is, in detail,

$$\lambda_2(G) < \Delta_2(G) - \frac{1}{n^2}.$$

A classical theorem proved by Hong [*Linear Algebra Appl.* 1988] states that $\lambda_1(G) \leq \sqrt{2m-n+1}$ for a connected graph G with n vertices and m edges, where the equality holds if and only if G is a star S_n or a complete graph K_n. We give a refinement on Hong's theorem by showing

$$\lambda_1(G) < \sqrt{2m-n}$$

for any connected graph $G \notin \{S_n, S^1_{n-1}, K_n, K^1_{n-1}\}$. Based on this improved upper bound of $\lambda_1(G)$, for a connected graph G with n vertices and m edges, we are able to prove a sharp upper bound of $\lambda_2(G)$ that

$$\lambda_2(G) \leq \sqrt{m - \frac{n}{2} - \frac{1}{2}},$$

except G is obtained from two disjoint $S_{\frac{n}{2}}$ by adding an edge between a pendant vertex of each star. Moreover, we provide a complete characterization to extremal graphs attaining the equality.

报告人简介：王志文，华东理工大学副教授，硕士生导师，2020-2022年在南开大学跟史永堂老师做博士后，主要研究兴趣是代数图论、图论及其应用，目前在 J. Algebraic Combin., Election J. Combin. 等期刊发表论文 20 余篇，已获得中国博士后基金、国家青年基金、上海市“晨光计划”项目等。

On the Chromatic Profile for Tripartite Graphs and Beyond

Yisai Xue

Ningbo University

Let H be a graph and let $\delta_\chi(H,r)$ denote the infimum of c such that every H-free graph with minimum degree at least cn is r-colorable. The *chromatic profile* of H is defined to be the values of $\delta_\chi(H,r)$ as r varies. Erdős and Simonovits described this parameter as "too complicated" and it was later highlighted again as a formal open problem by Allen, Böttcher, Griffiths, Kohayakawa, and Morris: determine the chromatic profile of every graph H.

Based on the concept of vertex-extendable due to Liu, Mubayi, and Reiher, we define the *vertex-extendable threshold* of H, denoted by $\delta_{\text{ext}}(H,r)$, as the infimum of $c \in (0,1)$ so that for every H-free graph G on n vertices, the existence of a vertex $v \in V(G)$ with $\chi(G-v) \le r$ combined with $\delta(G) \ge cn$ implies that G is r-colorable. We showed that $\delta_\chi(H,2) = \max\left\{\delta_\chi(C_{2k+1},2), \delta_{\text{ext}}(H,2)\right\}$, where H is a color-critical graph with $\chi(H) = 3$ and $g_{\text{odd}}(H) = 2k+1$ for $k \ge 2$. Consequently, we obtain the set of possible values of $\delta_\chi(H,2)$ for graphs H with $\chi(H) = 3$ is finite and discrete:

$$\{\delta_\chi(H,2) : \chi(H) = 3\} = \left\{\frac{1}{2}, \frac{2}{5}, \frac{2}{7}, \frac{1}{4}, \frac{2}{9}, \frac{1}{5}, \frac{2}{11}, \frac{1}{6}\right\}.$$

Moreover, we give a complete structural characterization of the graphs H corresponding to each of these threshold values. In addition, we determine $\delta_\chi(H,r)$ for every $r \ge 2$ when H is an edge-critical graph with odd girth $g_{\text{odd}}(H) = \chi(H) = 3$.

This is joint work with Bo Ning and Jian Wang.

报告人简介：薛益赛，宁波大学讲师，2024 年博士毕业于上海大学，导师为康丽英教授。2023-2024 在 IBS 进行联合培养，合作导师为刘鸿教授。在 Peking Mathematical Journal，Journal of Combinatorial Theory, Series B，Journal of Graph Theory 等期刊上发表论文 10 余篇。

A Vertex Polynomial Invariant for Embedded Graphs

Qi Yan

Lanzhou University

The ribbon group action extends geometric duality and Petrie duality by defining two embedded graphs as twisted duals precisely when they lie within the same orbit under this group action. Twisted duality yields numerous novel properties of fundamental graph polynomials. In this talk, we resolve a problem raised by Ellis-Monaghan and Moffatt [Trans. Amer. Math. Soc. 364 (2012), 1529-1569] for vertex counts by introducing the vertex polynomial: a generating function quantifying vertex distribution across orbits under the ribbon group action. We establish its equivalence via transformations of boundary component enumeration and derive recursive relations through edge deletion, contraction, and twisted contraction. For bouquets, we prove the polynomial depends only on signed intersection graphs. Finally, we provide topological interpretations for the vertex polynomial by connecting this polynomial to the interlace polynomial and the topological transition polynomial. (Joint work with Qingying Deng and Metrose Metsidik.)

报告人简介：颜棋，兰州大学副教授，硕士生导师。2020 年毕业于厦门大学（导师为金贤安教授）。2018 年 9 月至 2019 年 9 月在澳大利亚莫纳什大学访学一年。主要从事带子图和 delta-拟阵研究，主持国家自然科学基金青年和面上项目各一项。目前在《Forum Math. Sigma》《Fund. Math.》《J. Combin. Theory Ser. A》《European J. Combin.》《Adv. Appl. Math.》等国内外高水平数学期刊上发表学术论文。

What Parameters Guarantee Structural Stability of Graphs Forbidding C_{2k+1}

Zilong Yan

Hunan University

Starting from the stability theorem of Erdős and Simonovits, there have been interesting studies on stability of graphs forbidding certain subgraphs in terms of edge numbers and minimum degrees. It would be interesting to ask what parameters will guarantee structural stability in graphs forbidding certain subgraphs. In this paper we obtain structural stability of C_{2k+1}-free in terms of the number of copies of C_4.

Let $T^*(r,n)$ be the graph consisting of a $K_{\lfloor\frac{n-r+1}{2}\rfloor,\lceil\frac{n-r+1}{2}\rceil}$ and a K_r sharing exactly one vertex. We show that if $\mathscr{N}(C_4,G) \geq \mathscr{N}(C_4,T^*(r,n))$, then G is obtained by adding suspensions to a bipartite graph B one by one, and the total number of vertices not in B is no more than $r-1$. Furthermore, $|V(G)-V(B)| = r-1$ if and only if $G = T^*(r,n)$.

报告人简介：严子龙，湖南大学助理教授，2023 年获湖南大学博士学位，2023-2025 年在湖南大学从事博士后研究，主持中国博士后科学基金面上项目，获国家资助博士后研究人员计划项目。主要研究图和超图中的极值问题、Ramsey 问题，研究成果发表 Siam J. Discrete Math.，J. Graph Theory，Eur. J. Combin.，Discrete Math.。

Packing 4-cliques in Edge-weighted Graphs

Donglei Yang

Shandong University

A celebrated result of Hajnal and Szemerédi in 1970 gives the best possible bound on the minimum degree of a graph which guarantees the existence of K_r-factors (the $r = 3$ case was previously obtained by Corrádi and Hajnal. Balogh, Kemkes, Lee and Young proposed a variant of Hajnal-Szemerédi Theorem in edge-weighted graphs, asking for the minimum (weighted) degree condition for heavy K_r-factors. The basic triangle case was resolved by Balogh, Molla and Sharifzadeh in 2016. We resolve the next open case (i.e. 4-clique).

报告人简介：杨东雷，山东大学齐鲁青年学者，2020 年博士毕业于山东大学数学学院，曾到佐治亚理工学院访问郁星星教授。2020-2023 年在山东大学数据科学研究院从事博士后研究。研究方向包括图子式理论，Ramsey-Turán 理论，伪随机图理论等。研究课题曾获得国家自然科学青年基金项目和面上项目资助。目前在 JLMS, Combinatorica, JCTB, RSA, JGT, CPC 以及 SIDMA 等期刊发表论文多篇。

New Constructions of Vertex-primitive 2-arc-transitive Digraphs

Fugang Yin

Beijing Jiaotong University

A 2-arc in a digraph is a sequence of three distinct vertices $u \to v \to w$ such that both $u \to v$ and $v \to w$ are arcs. A digraph is said to be 2-arc-transitive if its full automorphism group acts transitively on the set of its 2-arcs, and is vertex-primitive if this group acts primitively on the vertex set. In 1990, Praeger posed the question of whether there exist vertex-primitive 2-arc-transitive digraphs with an almost simple automorphism group. In 2017, Giudici, Li, and Xia constructed the first examples of such digraphs, providing an infinite family associated with the action of $\mathrm{PSL}_3(q)$ on the cosets of A_6, where $q = p^2$ and $p \equiv 2,3 \pmod 5$. No further examples were found after Giudici-Li-Xia's construction. In this talk, I will present a systematic approach to analyze the existence of such digraphs based on vertex stabilizers, and introduce a new construction of such digraphs admitting automorphism groups $\mathrm{PSL}_3(q)$ and $\mathrm{PSU}_3(q)$. This is joint work with Cixuan Wu (Yunnan University of Finance and Economics).

报告人简介：尹富纲，2022 年博士毕业于北京交通大学，导师冯衍全教授, 现工作于北京交通大学，高聘副教授。主要从事代数图论方面的研究, 研究兴趣主要有 s-弧传递图和凯莱图。发表论文近 30 篇，一些成果发表在 Trans. Amer. Math. Soc., JCTA/B, J. Algebra, J. Graph Theory 等期刊。主持一项国家自然科学基金-青年基金项目。

Anti-Ramsey Numbers for Cancellative Configurations in Uniform Hypergraphs

Longtu Yuan

East China Normal University

We study edge-colorings of the complete p-graph on n vertices that contain no three edges A,B,C of distinct colors such that the symmetric difference of A and B is contained in C. For $p \geq 3$ and $n \geq p+1$, we show that every such coloring contains at most $1+\lfloor n/p \rfloor$ colors and characterize the extremal colorings, generalizing a theorem of Erdős, Simonovits and Sós. When $p=3$, the condition $A\triangle B \subseteq C$ implies $|A\triangle B|=2$, and the three edges necessarily form a copy of $F_4 := \{abc, abd, bcd\}$ or $F_5 := \{abc, abd, cde\}$. For $n \geq 5$, we show that every rainbow F_5-free edge-coloring is rainbow cancellative. For rainbow F_4-free colorings, we construct colorings with $m(n)+1$ colors for all $n \geq 4$, where $m(n)$ is the size of a maximum partial Steiner triple system of order n and satisfies $m(n) = n^2/6+O(n)$, improving the linear lower bound by Budden and Stiles. Moreover, for $n=2^s-1$, we obtain $\mathrm{ar}(n,F_4) \geq m(n)+n^2/42+o(n^2)$ via a construction based on independent sets in the Grassmann graph.

报告人简介：袁龙图，2017 年博士毕业于上海交通大学，2017-2019 年于中国科学技术大学任博士后，2019 年起入职华东师范大学数学科学学院，现为华东师范大学数学科学学院副教授。在 Combinatorica、J. Combin. Theory Ser. B、Canad. J. Math. 、Combin. Probab. Comput.、SIAM J. Discrete Math. 、Euro. J. Combin. 、J. Graph Theory、Electron. J. Combin. 等国内外知名 SCI 期刊发表学术论文 30 余篇，获得 2023 年度 Discrete Math. 编辑精选论文奖。袁龙图完成国家博士后基金 1 项，国家自然科学基金青年项目 1 项，主持国家自然科学基金面上项目 1 项，参与国家自然科学基金重点项目 1 项，参与完成华为企业委托项目 1 项。

Paths with Equal-degree Endpoints

Qinghou Zeng

Fuzhou University

For any positive integers ℓ and n, let $p_\ell(n)$ denote the maximum number of edges in an n-vertex graph that contains no two vertices of equal degree connected by a path of length ℓ. Recently, Chen and Ma determined $p_\ell(n)$ for each $\ell \in \{1,2,3\}$. In this talk, we give some tight results for $\ell \in \{4,5\}$.

报告人简介：曾庆厚，福州大学副教授，博士生导师，曾于中国科学技术大学从事博士后研究工作。主要从事图与超图划分方面的研究，在专业领域权威期刊发表学术论文多篇，主持国家自然科学基金两项。

Attempts on Haemers Conjecture

Da Zhao

East China University of Science and Technology

Haemers conjectures that almost all graphs are determined by their spectra, in other words almost all graphs have no cospectral mate or "one can hear the shape of almost all graphs". We show the following results.

1. Almost all graphs have no cospectral mate with fixed level ℓ for every $\ell \geq 2$.
2. Almost all graphs have no cospectral mate with bounded height h for every $h \geq 2$.
3. Almost all digraphs are not isomorphic to its reverse. Therefore Haemers conjecture fails for digraphs.
4. We introduce the concept of multivariate graph spectrum and show its strength. We also talk about its relation with Ziqing Xiang's latest proof of a Haemers conjecture variant.

This talk is based on joint work with Yanrui Xu and Wei Wang.

报告人简介：赵达，华东理工大学讲师，2021 年在上海交通大学获得博士学位，曾在京都大学从事博士后研究工作，主要研究方向是组合与图论。主持一项国家自然科学青年基金，代表作发表在《Advance in Mathematics》《Journal of the London Mathematical Society》《Journal of Algebra》《Journal of Combinatorial Theory Series A》等学术期刊上。

Minimum Feedback Arc Set and Feedback Arc Set Decompositions

Yacong Zhou

Shenzhen Institutes of Advanced Technology

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In this talk, we present new upper bounds for the minimum feedback arc set problem. In particular, we obtain tight upper bounds for minimum weight feedback arc sets in digraphs with upper-bounded maximum degree and lower-bounded directed girth by introducing and studying a new parameter, the feedback arc set decomposition number, defined as the maximum number of arc-disjoint feedback arc sets into which the arc set of a digraph can be partitioned.

We also discuss connections to Woodall's conjecture (1976), which remains open.

This talk is based on joint work with Gregory Gutin, Mads Anker Nielsen, and Anders Yeo.

报告人简介：周亚聪，中国科学院深圳先进技术研究院博士后。主要研究领域为图论及组合优化。在《SIAM Journal on Discrete Mathematics》、《Journal of Graph Thoery》、《Discrete Mathematics》等期刊上发表论文 10 余篇。

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