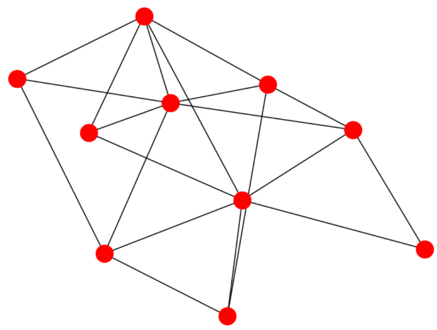
The 62nd MidWest Graph TheorY Conference

The Ohio State University at Marion

October 18-19, 2019



Welcome address

Welcome to MIGHTY LXII at OSU-Marion! We are very excited for a full day of research talks and collaboration. This conference is funded by a generous contribution from OSU-Marion Dean Gregory Rose. If you have any questions or concerns about your stay in Marion, please contact one of the local organizing committee. Thank you for coming and we hope you have an enjoyable and productive conference.

Micah Chrisman
John Maharry
Murong Xu

Plenary speakers

Dr. Sergei Chmutov is a Professor of Mathematics at The Ohio State University at Mansfield campus. He received his PhD from Moscow State University in 1985. His research is in low-dimensional topology, knot theory, combinatorics, graph theory, theory of singularities of algebraic varieties, and algebraic geometry. He is also a co-author of the book "*Introduction to Vassiliev Knot Invariants*" (with S. Duzhin and J. Mostovoy).

Dr. Hong-Jian Lai is a Professor of Mathematics at West Virginia University. He received his PhD from Wayne State University in 1988. His research is in graph theory, combinatorics and matroid theory. He published more than two hundred papers as well as two monographs, and serves as the editorial board member in Graph and Combinatorics, and Applied Mathematics.

Schedule

Saturday October 19, 2019

08:30am-09:00am

Registration & Coffee .... 3^{rd} floor Morrill Hall

09:00am-09:50am

Plenary talk .... Morrill Hall 200

Hong-Jian Lai

Eigenvalues and structural properties of graphs

10:00am-10:15am

Registration & Coffee .... 3^{rd} floor Morrill Hall

10:15am-10:35am

Parallel Sessions

Lucian Mazza

Group coloring of graphs .... Morrill Hall 210

James Hallas

Irregularity strength and beyond .... Morrill Hall 219

Rinovia Simanjuntak

Magic rectangles and distance magic product graphs ... Morrill Hall 224

10:40am-11:00am

Parallel Sessions

Alexis Byers

Graph ideals and the down arrow Ramsey set .... Morrill Hall 210

Khandoker Mohammed Mominul Haque

Irregular labellings of Knödel graphs .... Morrill Hall 219

Dan Slilaty

Quasi-graphic matroids .... Morrill Hall 224

11:05am-11:25am

Parallel Sessions

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The proper k-Ramsey set .... Morrill Hall 210

Mustafa Atici

Minimum geodetic ratio, color sequence, and their relation in graph G .... Morrill Hall 219

Sulin Song

Reliability of burnt pancake networks based on conditional fault .... Morrill Hall 224

11:30am-11:50am

Parallel Sessions

Alzalg Baha

Cycle-complete graph Ramsey numbers .... Morrill Hall 210

Jian-Bing Liu

On weighted modulo orientation of certain graphs ..... Morrill Hall 219

Yang Wu

Characterizations of matroids with an element lying in a restricted number of circuits .... Morrill Hall 224

12:00pm-02:00pm

FREE LUNCH .... 3^{rd} floor Morrill Hall

02:00pm-02:50pm

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Sergei Chmutov

Stanley's chromatic symmetric function

03:00pm-03:20pm

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Hamiltonicity and degrees on restricted vertices in claw-free graphs .... Morrill Hall 210

Terry McKee

Dualizing distance-hereditary graphs .... Morrill Hall 219

Allan Bickle

Wiener indices of maximal k-degenerate graphs .... Morrill Hall 224

03:25pm-03:45pm

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Yehong Shao

Fully cycle extendable line graphs of triangular graphs . Morrill Hall 210

Raghavendra Bhat

Prime number conjectures .... Morrill Hall 219

Zevi Miller

New lower bounds for permutation arrays using contraction .... Morrill Hall 224

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Taoye Zhang

On s-Hamiltonian connected line graphs .... Morrill Hall 210

Jake Huryn

Stanley's conjecture and chromatic bases .... Morrill Hall 219

Mark Ellingham

The structure of 4*-conneced* $K_{2;t}$*-minor-free graphs* .... Morrill Hall 224

04:15pm-04:35pm

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Mingquan Zhan

Hamiltonicity of 3*-connected line graphs with diameter* 3 .... Morrill Hall 210

Raghavan Rushil

A signed generalization of Stanley's symmetric chromatic polynomial .... Morrill Hall 219

Peter Luo

Wiener's index of unicyclic graphs with given number of even vertices .... Morrill Hall 224

04:35pm-04:55pm

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Closed walks in graph encoded maps .... Morrill Hall 210

Noah Donald

A symmetric chromatic function for voltage graphs .... Morrill Hall 219

Madeline Cope

Light up the darkness: an application of graph theory to Merlin's game .... Morrill Hall 224

Abstracts

Minimum Geodetic Ratio, Color Sequence, and Their Relation in Graph G

11:05am
Room 219

Mustafa Atici

Western Kentucky University

For a given graph G, definitions of (t,k)-geodetic set and minimum geodetic ratio $mgr(G)$, which is minimum ratio of all possible (t,k)-geodetic are defined and some of $mgr(G)$ are studied. We also defined the color sequence of a graph and observe some properties between color sequence and $mgr(G)$. An algorithm to compute upper bound for $mgr(G)$ is also given.

Cycle-complete graph Ramsey numbers

11:30am
Room 210

Alzalg Baha

Ohio State University

The cycle-complete graph Ramsey number $r(C_n, K_m)$ is the smallest integer N such that every graph G of order N contains a cycle C_n on n vertices or its complement $\bar{G}$ contains a complete graph K_m on m vertices. It has been conjectured by Erdős, Faudree, Rousseau and Schelp that $r(C_n, K_m) = (n-1)(m-1)+1$, $n \geq m \geq 3$, $(n,m) \neq (3,3)$. In this talk, we introduce some results related to the cycle-complete graph Ramsey numbers, and then present results leading to a proof for the conjecture in the case $n = m = 8$.

Prime Number Conjectures

3:25pm
Room 219

Raghavendra Bhat

Wright State University

Over the course of time, prime numbers have been the biggest of mysteries in number theory. There have been various claims made and theorems discovered. The goal has always been to find ways to generate primes, understand their randomness and to predict their behavior. Over the course of my teenage, I discovered over 30 conjectures in primes and verified them all up-to billions and trillions. Although, these numbers are tiny in the over all ocean of numbers, I intuitively feel that my conjectures do work for all natural numbers. I wish to share 3-4 of my most complex conjectures at the conference and talk about how, if proven, they can result in a huge progress in modern day number theory. I also wish to share a couple of sequences that I recently discovered related to prime numbers. All of the work that I will be presenting at the conference is original and not borrowed from any source. I am honored to be given a platform to present them before a highly proficient math audience.

Wiener indices of maximal k-degenerate graphs

3:00pm
Room 224

Allan Bickle

Penn State Altoona

The Wiener index of a graph is the sum of the distances between all pairs of its vertices. A graph is k-degenerate if its vertices can be successively deleted so that when deleted, they have degree at most k. In this paper, we provide sharp lower and upper bounds on Wiener indices of maximal k-degenerate graphs of order $n \ge k+1$. The chordal maximal k-degenerate graphs of order $n \ge k$ are k-trees. For k-trees, we characterize all extremal graphs for the upper bound.

Graph Ideals and the Down Arrow Ramsey Set

10:40am
Room 210

Alexis Byers

Youngstown State

In traditional Ramsey Theory, we ask the question: Given two graphs F and H, what is the smallest positive integer n such that every red-blue coloring of K_n results in a red F or a blue H? We can ask this same question about colorings of graphs G which are not necessarily complete. A graph G is said to arrow the graphs F and H, written $G \to (F;H)$, if every red-blue coloring of G results in a red F or a blue H. In this case, the primary question has been determining graphs G for which $G \to (F;H)$. This is just an extension of the question asked above. If we consider the version for which $F = H$, then we can ask a different question: Given a graph G, can we determine all graphs F such that $G \to (F;F)$, or simply $G \to F$? We call this set of graphs the *down arrow Ramsey set* of G, or $\downarrow G$. In this talk, we will discuss classes of graphs for which we have determined the down arrow Ramsey set, using methods of Ramsey Theory and through the lens of graph ideals, a concept we also introduce in this talk.

Hamiltonicity and degrees on restricted vertices in claw-free graphs

3:00pm
Room 210

Zhi-Hong Chen

Butler University

Let be a simple graph. A vertex with degree one in is an end-vertex of . Let N be the graph obtained from a K_3 by adding a pendant edge on each vertex of K_3. A such graph N is called a net. In 1993, at Workshop Cycles and Colorings (Novy Smokovec, Slovakia), Broersma conjectured that for 2-connected claw-free graphs H, if the degree on each end-vertex of each induced net N is at least $(|V(H)| - 2)/3$, then H is Hamiltonian. In 2016, Cada et al posed a conjecture that the conclusion of Broersma conjecture is also true if \induced net N" is replaced by \an induced path P_6 of order 6". Recently, I solved these two conjectures. In my talk, I will present my proofs of these two conjectures and discuss some related conjectures and open problems.

Stanley's chromatic symmetric function

2:00pm
Room 200

Sergei Chmutov

Ohio State University

Richard Stanley introduced the symmetric chromatic function of a graph in 1995 as a generalization of the classical chromatic polynomial. It is a formal power series in countably many variables. As such it can be expressed through a basis of symmetric functions. The expression in terms of the basis of symmetric power functions it appeared in knot theory in our old work of 1994. My talk will consist of three parts. In the first part, I will introduce the symmetric chromatic function, explain how to express it in terms of the symmetric power functions, and formulate two conjectures. The second part will be a crushed course of invariants of knots in which I will try to explain how the symmetric chromatic function appeared in this context. In the third part, I will speak about our resent result that the generating function for the symmetric chromatic function of all connected graphs provide a solution of the Kadomtsev-Petviashvili (KP) integrable PDEs of mathematical physics.

Light Up the Darkness: An Application of Graph Theory to Merlin's Game

4:35pm
Room 224

Madeline Cope

Youngstown State

The Lights Out Game is a handheld electronic toy that was created in 1995. The goal of the game is to turn all the lights out, it is traditionally played on a given ve by ve grid. Turning one light o also turns adjacent lights o . A variation of the Lights Out game is Merlin's game, which is just like Lights Out except the center light should remain on. This talk will focus on applying Merlin's game to complete graphs, cycles, paths and wheels.

A Symmetric Chromatic Function for Voltage Graphs

4:35pm
Room 219

Noah Donald

Ohio State University

We formulate a version of the symmetric chromatic function for voltage graphs. We analyze properties of this function, o er a subsets of edges formulation of the symmetric chromatic function, and use this to motivate a weighted contraction-deletion formula. We also look at decompositions of the symmetric chromatic function and moving over edges in a graph to see how this transformation can leave the symmetric chromatic function invariant.

Closed Walks in Graph-Encoded Maps

4:35pm
Room 210

Blake Dunshee

Vanderbilt University

Deng and Jin characterized all Eulerian partial duals of a ribbon graph in terms of crossing-total directions of its medial graph. We use graph encoded maps (gems) to extend the results of Deng and Jin. Our main results are based on consequences of the parity of certain colors in closed walks in gems and jewels. The parity of colors in closed walks gives us characterizations of Petrie orientable cellularly embedded graphs in terms of all-crossing directions of the medial graph. We also describe other correspondences between properties of an embedded graph and all-crossing directions of its medial graph and characterize embedded graphs with bipartite medial graphs.

The structure of 4-connected $K_{2,t}$-minor-free graphs

3:50pm
Room 224

Mark Ellingham

Vanderbilt University

Guoli Ding has provided a rough structure theorem for $K_{2,t}$-minor free graphs for all t. As a special case of his theorem, 4-connected $K_{2,t}$-minor-free graphs are obtained by attaching strips, consisting of two paths joined by edges with restricted crossings, to a finite set of base graphs. The first value of t where this applies in a nontrivial way is $t = 5$. We give a characterization of 4-connected $K_{2,5}$-minor-free graphs that shows that they can be obtained from a cyclic sequence of four types of subgraph. Consequently, we can derive a generating function and asymptotic estimate for the number of nonisomorphic 4-connected $K_{2,5}$-minor-free graphs of a given order. Our work extends to general t by providing a more precise description of the strips in Ding's result, suggesting a general asymptotic counting conjecture. This is joint work with J. Zachary Gaslowitz and Ryan Solava.

Irregularity Strength and Beyond

10:15am
Room 219

James Hallas

Western Michigan University

As far back as 1880, in an attempt to solve the Four Color Problem, there have been numerous examples of certain types of graph colorings that have generated other graph colorings of interest. These types of colorings only gained momentum a century later, however, when in the 1980s, edge colorings were studied that led to vertex colorings of various types, led by the introduction of the irregularity strength of a graph. In this talk, we take another look at the concept of irregularity strength and describe a related concept. Results and conjectures are presented on this topic. This is joint work with Gary Chartrand, Ebrahim Salehi, and Ping Zhang.

Stanley's Conjecture and Chromatic Bases

3:50pm
Room 219

Jake Huryn

Ohio State University

In 1995, Stanley introduced the chromatic symmetric function, a symmetric function generalization of the chromatic polynomial of a graph. In his paper, Stanley conjectured that this new graph invariant is in fact a complete invariant for trees. This question remains open despite solutions in special cases. In this talk we describe a new approach to the chromatic symmetric function, which seeks to illuminate the structure of this invariant by examining it in different chromatic bases—algebraic bases for the ring of symmetric functions which are built from chromatic symmetric functions of trees.

Eigenvalues and structural properties of graphs

9:00am
Room 200

Hong-Jian Lai

West Virginia University

Let G be a simple graph on n vertices and let A be the adjacency matrix of G, and let $\lambda_i(G)$ be the ith largest eigenvalue of A. Motivated by a problem of Seymour ([Linear Algebra Appl. 437 (2012) 630{647]), Cioabă and Wong proved that for $k \in \{2; 3\}$, a condition in terms of an upper bound of $\lambda_2(G)$ to warrant G to have k-edge-disjoint spanning trees, and posed a conjecture for all integer k with $k \geq 4$. In [Electronic Journal of Linear Algebra, 34 (2018) 428-443], A. Abiad et al. proposed an open problem suggesting to use the $\lambda_2(G)$ to predict the connectivity of G. In this talk, we will report the recent progresses and development towards the above-mentioned conjecture and open problems, as well as other related studies.

On weighted modulo orientation of certain graphs

11:30am
Room 219

Jian-Bing Liu

West Virginia University

Esperet, De Verclos, Le and Thomassé in [SIAM J. Discrete Math., 32(1) (2018), 534{542] introduced the problem that given an odd prime p, whether there exists an orientation D of a graph G for any mapping $f : E(G) \to Z_p$ and any Z_p-boundary b of G, such that under D, at every vertex, the net out f-flow is the same as $b(v)$ in Z_p. Such an orientation D is called an $(f; b; p)$-orientation of G. Esperet et al indicated that this problem is closely related to mod p-orientations of graphs, including Tutte's nowhere zero 3-flow conjecture and showed $(6p^2 - 14p + 8)$-edge-connected graphs have $(f; b; p)$-orientations. We show that every $(12p^2 - 28p + 15)$-edge-connected signed graphs admit $(f; b; p)$-orientations, and that the Esperet et al's edge-connectivity lower bound can be reduced for certain graphs families including planar graphs, complete graphs, chordal graphs and bipartite graphs.

Wiener's Index of unicyclic graphs with given number of even degree vertices

4:15pm
Room 224

Peter Luo

Morgantown H.S.

In 1947, chemist Harry Wiener introduced the Wiener Index. This index was used to describe alkanes, and has shown a correlation with the boiling point, viscosity in its liquid state, and even its Van der Waals surface area of the molecule. For any graph $G = (V; E)$ and any two vertices $u; v \in V$; we define $d(u; v)$ to be the distance between u and v: Moreover, we define the Wiener's index of a graph to be $\frac{1}{2} \sum_{u \in V} \sum_{v \in V} d(u; v)$: We consider all unicyclic graphs with given number of vertices n; and given number of even degree vertices r; in which we denote as $U_{n;r}$: In this project, we want to find the structure of a graph $G \in U_{n;r}$ and the respective $W(G)$

such that the Wiener's Index is minimized. This project is mentored by Professor Xiaodong Zhang from Shanghai Jiaotong University and Professor Cun-Quan Zhang from West Virginia University.

Group Coloring of Graphs

10:15am
Room 210

Lucian Mazza

West Virginia University

Group Coloring is a generalization of vertex coloring. The vertices of a graph are colored with the elements of a group in such a way that the colors of two adjacent vertices do not differ by a group value assigned to the edge between them. Some basic properties and definitions will be presented, followed by recent unpublished results including group coloring of disjoint unions of graphs and group coloring of multigraphs.

Dualizing Distance-Hereditary Graphs

3:00pm
Room 219

Terry McKee

Wright State University

Distance-hereditary graphs have been nicely characterized by every cycle of length at least 5 having crossing chords. This makes distance-hereditary graphs susceptible to dualization, using the common extension of geometric face/vertex duality in plane graphs to cycle/cutset duality in arbitrary graphs (and matroids). I will characterize the resulting graphs, analyze their connectivity, and show how they are the "genuine duals" of distance-hereditary graphs.

New lower bounds for permutation arrays using contraction

3:25pm
Room 224

Zevi Miller

Miami University

Consider a set A of permutations on a set S of n distinct letters, viewing the elements of A as strings of length n over A. We let $M(n; d)$ be the maximum of $|A|$, subject to the requirement that any two elements of A disagree in at least d positions. We use the permutation groups $AGL(1; q) = \{x \to ax + b : a; x; b \in GF(q); a \neq 0\}$ acting sharply 2-transitively on $GF(q)$, and $PGL(2; q) = \{x \to \frac{ax+b}{cx+d} : x; a; b; c; d \in GF(q); ad - bc \neq 0\}$ acting sharply 3-transitively on $GF(q) \cup \{\infty\}$ to obtain constructive lower bounds for $M(n; d)$. Specifically, we define a contraction operation on these groups to obtain the following lower bounds for prime powers q satisfying $q \equiv 1 \pmod 3$.

1. $M(q - 1; q - 3) \geq (q^2 - 1)/2$ for q odd, $q \geq 7$,

2. $M(q-1;q-3) \geq (q-1)(q+2)/3$ for q even, $q \geq 8$,

3. $M(q;q-3) \geq Kq^2\log(q)$ for some constant K if q is odd, $q \geq 13$.

We also obtain lower bounds for $M(n;d)$ for a finite number of exceptional pairs $n;d$, by applying this contraction operation to the sharply 4 and 5-transitive Mathieu groups.

Irregular total labellings of Knödel Graphs $W_{3;n}$

10:40am
Room 219

Khandoker Mohammed Mominul Haque

Shahjalal University of Science and Technology

The total edge irregularity strength $tes(G)$ and total vertex irregularity strength $tvs(G)$ are invariants analogous to irregular strength $s(G)$ of a graph G for total labellings. Concerning these parameters; Baca et al.[1] determined the bounds and precise values for some families of graphs. In this paper, we show the exact values of the total edge irregularity strength $tes(W_{3;n})$ = n/2 + 1 total vertex irregularity strength and $tvs(W_{3;n}) = \lceil n/4 \rceil + 1$ for the Knödel Graphs $W_{3;n}$.

The Proper k-Ramsey Number

11:05am
Room 210

Drake Olejniczak

Purdue University Fort Wayne

The Ramsey number of two graphs F and H is the smallest positive integer n for which every red-blue coloring of the edges of K_n results in either a red F or a blue H. In this case, we are concerned with monochromatic colorings. Monochromatic colorings are not the only type of coloring, however. A proper coloring of a graph is a coloring of its edges so that any two adjacent edges are assigned different colors. From this coloring idea, the concept of the proper Ramsey number has been introduced. In this case, the proper Ramsey number of two graphs F and H is the smallest positive integer n for which every t-coloring of the edges of K_n results in a monochromatic F or a properly colored H. Here, $t = \chi'(H)$, the chromatic index of H. In this talk we present a generalization of the proper Ramsey number and share new results on this topic.

A Signed Generalization of Stanley's Symmetric Chromatic Polynomial

4:15pm
Room 219

Raghavan Rushil

Ohio State University

In a landmark 1995 paper, Stanley introduces a symmetric generalization of the chromatic polynomial of a graph, X_G. By encoding information regarding the multiplicity of a color in any given coloring, the symmetric chromatic polynomial proved to be a much stronger graph invariant than the original chromatic polynomial. This sparked several notable conjectures and other work regarding its enumerative and algebraic properties. In this vein, we rst introduce a new, simpler proof of a previously known weighted contraction-deletion relation on X_G, which no longer relies on an expression in the power sum basis of symmetric functions. From there, we consider a B_n-type symmetric generalization of the chromatic polynomial of a signed graph. We then develop a new weighted-contraction deletion identity for the signed symmetric chromatic polynomial. Notably, this identity relies on the introduction of ordered-pair weights on the vertices of a graph, similar to the integer weights observed in the unsigned case. Moreover, we introduce two other methods of computing the symmetric chromatic polynomial of signed graphs, one considering subsets of the edge set and the other considering partitions of the vertex set. Finally, the techniques that yield these generalizations can be naturally adjusted to a symmetric chromatic polynomial of a voltage graph, yielding similar formulae and results.

Fully cycle extendable line graphs of triangular graphs

3:25pm
Room 210

Yehong Shao

West Virginia University

A graph G is said to be fully cycle extendable if every vertex of G lies in a triangle and for every non-Hamiltonian cycle C there is a cycle C^0 in G such that $V(C)$ $V(C^0)$ and $jV(C^0)j = jV(C)j + 1$. If the removal of any s vertices in G results in a fully cycle extendable graph, we say G is an s-fully cycle extendable graph. A graph G is k-triangular if each edge of G lies in at least k triangles and G is triangular if it is 1-triangular. The line graph of a graph G, denoted by $L(G)$ or $L^1(G)$, has $E(G)$ as its vertex set, where two vertices in $L(G)$ are adjacent if and only if the corresponding two edges in G have a common vertex. Iteratively, $L^n(G) = L(L^{n\ 1}(G))$ and $L^0(G) = G$. Let s 0, k 1 be integers and G be a k-triangular graph. We study for which values of $s > k$, $L(G)$ is s-fully cycle extendable if and only if (G) $s + 2$.

Magic Rectangles and Distance Magic Product Graphs

10:15am
Room 224

Rinovia Simanjuntak

Institut Teknologi Bandung

A graph G is said to be distance magic if there exists a bijection $f: V \to \{1, 2, \ldots, v\}$ and a constant k such that for any vertex x, $\sum_{y \in N(x)} f(y) = k$, where $N(x)$ is the set of all neighbours of x. In this talk we shall study the magic column rectangle, which is a generalization of the magic rectangle set introduced by Froncek in 2017. Finally, we shall utilize magic column rectangles to construct distance magic labelings for graphs obtained from four graph products: cartesian, strong, lexicographic, and kronecker.

Quasi-graphic Matroids

10:40am
Room 224

Dan Slilaty

Wright State University

A theta graph is a graph consisting of the union of three internally disjoint paths sharing the same endpoints. A biased graph is a pair $(G, \mathcal{B})$ in which G is a graph and $\mathcal{B}$ is a collection of cycles in G called balanced which satisfy the following property: any theta subgraph of G does not contain exactly two balanced cycles. Biased graphs are an invention of Tom Zaslavsky.

Since Zaslavsky first defined biased graphs he associated with them two distinct matroids: the frame matroid and the lifted-graphic matroid. The circuits of the frame matroid are edge sets of: balanced cycles, theta subgraphs with no balanced cycles, pairs of unbalanced cycles intersecting in a vertex, and pairs of vertex-disjoint unbalanced cycles along with a minimal connecting path. The circuits of the lifted-graphic matroid are edge sets of: balanced cycles, theta subgraphs with no balanced cycles, pairs of unbalanced cycles intersecting in a vertex, and pairs of vertex-disjoint unbalanced cycles. Thus the difference between the circuits of the two matroids lies with pairs of vertex-disjoint unbalanced cycles.

Quasi-graphic matroids are a recent development of Geelen, Gerards, and Whittle. The quasi-graphic matroids for a biased graph $(G, \mathcal{B})$ are a partially-ordered set of matroids for which the lifted-graphic matroid and frame matroid are the unique minimal and maximal elements. Recent work by Bowler, Funk, and myself sheds much light on the underlying structure of quasi-graphic matroids.

Reliability of burnt pancake networks based on conditional fault

11:05am
Room 224

Sulin Song

West Virginia University

The n-dimensional burnt pancake network, denoted by BP_n, originates from the Burnt pancake problem which relates to the construction of networks of parallel processors. In the wake of the rapid development of multiprocessor systems, processor fault diagnosis plays an even more important role in measuring the reliability of a multiprocessor system, and the diagnosabilities of many well-known multiprocessor systems have been investigated. The conditional diagnosability has been widely accepted as a new measure of diagnosability by assuming that any faulty set can't contain all the neighbors of any node in a multiprocessor system. In this talk, we explore algebraic and combinatorial properties of burnt pancake networks and investigate the structural vulnerability as well as extra connectivities. Furthermore, we show that the classic diagnosability and the conditional diagnosability of BP_n $(n \geq 4)$ under the comparison model are n and $3n-4$, respectively. And the two corresponding diagnosabilities of BP_n $(n \geq 4)$ under the PMC model are n and $8n-13$, respectively.

Characterizations of matroids with an element lying in a restricted number of circuits

11:30am
Room 224

Yang Wu

West Virginia University

A matroid M with a distinguished element $e_0 \in E(M)$ is a rooted matroid with e_0 being the root. We present a characterization of all connected binary rooted matroids whose root lies in at most three circuits, and a characterization of all connected binary rooted matroids whose root lies in all but at most three circuits. While there exist infinitely many such matroids, the number of serial reductions of such matroids is finite. In particular, we find two finite families of binary matroids 1 and 2 and prove the following.

(i) For some $e_0 \in E(M)$, M has at most three circuits containing e_0 if and only if the serial reduction of M is isomorphic to a member in 1.

(ii) If for some $e_0 \in E(M)$, M has at most three circuits not containing e_0 if and only if the serial reduction of M is isomorphic to a member in 2.

These characterizations will be applied to show that every connected binary matroid M with at least four circuits has a 1-hamiltonian circuit graph.

Hamiltonicity of 3-connected line graphs with diameter three

4:15pm
Room 210

Mingquan Zhan

Millersville University of Pennsylvania

Saito conjectured that every 3-connected line graph of diameter at most 3 is hamiltonian unless it is the line graph obtained from the Petersen graph by adding at least one pendant edge to each of its vertices. This conjecture is proved in this note. This is a joint work with Drs. Hong-Jian Lai, Taoye Zhang, and Ju Zhou.

On s-Hamiltonian Connected Line Graphs

3:50pm
Room 210

Taoye Zhang

Penn State Scranton

For an integer s 0, G is s-hamiltonian connected if for any vertex subset S $V(G)$ with $|S|$ s, G S is hamiltonian connected. Thomassen in 1984 conjectured that every 4-connected line graph is hamiltonian (see [J. Graph Theory, 10 (1986) 309-324]), and Kuczel and Xiong in 2004 conjectured that every 4-connected line graph is hamiltonian connected (see [J. Graph Theory 66 (2011), 152-173]). Our results are as follows:
(i) For s 3, every $(s + 4)$-connected line graph is s-hamiltonian-connected.
(ii) For s 0, every $(s+4)$-connected line graph of a claw-free graph is s-hamiltonian-connected.

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