Liebe KombinatorikerInnen,

herzlich willkommen zum 24. Kolloquium über Kombinatorik, das 2004 nun schon zum dritten Mal in Magdeburg stattfindet!

Auch in diesem Jahr wird an zwei Tagen wieder eine Mischung unterschiedlicher Aspekte der Diskreten Mathematik präsentiert. Dazu gehören über 65 Kurzvorträge, die von vier Hauptvorträgen umrahmt werden.

Für das wissenschaftliche Programm des Kolloquiums 2004 sind, wie im letzten Jahr, die beiden Unterzeichner verantwortlich. Die lokale Organisation liegt in den Händen der Magdeburger "Diskreten Mathematik" am Institut für Algebra und Geometrie.

Wir hoffen, Sie fühlen sich bei uns in Magdeburg wieder wohl und der Besuch des Kolloquiums über Kombinatorik ist für Sie perönlich erfolgreich. Allen TeilnehmerInnen, die durch ihre Vorträge und ihr Kommen zum Gelingen der Tagung beitragen, sei an dieser Stelle ganz herzlich gedankt.

Bedanken möchten wir uns auch bei allen Studierenden, MitarbeiterInnen und Sekretärinnen, die bei der Vorbereitung und Durchführung dieser Veranstaltung geholfen haben.

Im nächsten Jahr findet vom 5. bis zum 9. September eine große Kombinatoriktagung in Berlin statt, die EuroComb2005. Stefan Felsner ist einer der Hauporganisatoren dieser Tagung. Er lädt alle TeilnehmerInnen unseres Magdeburger Kolloquiums herzlich ein, im September nächsten Jahres nach Berlin zu kommen. Um den Tagungskalender für die Kombinatoriker nicht zu überfrachten, haben wir uns entschlossen, im nächsten Jahr das Kolloquium über Kombinatorik einmalig in eine andere Tagung, nämlich die EuroComb, zu integrieren. In 2006 wird dann wieder ein "KolKom" in Magdeburg stattfinden. Weil es dann das 25. Kolloquium ist, werden wir uns sicherlich etwas besonderes einfallen lassen …

Stefan Felsner
Alexander Pott

Räume

Hauptvorträge	:	G03-315
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Tagungsbüro	:	G02-215
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Das Tagungsbüro ist am Freitag von 9 bis 18 Uhr geöffnet, am Samstag von 9 bis 16 Uhr. In dieser Zeit ist auch Zugang zum Internet in G02-212 möglich. Die Hauptbibliothek auf dem Campus ist am Freitag von 9 bis 21 Uhr und am Samstag von 9 bis 15 Uhr geöffnet. Das gemeinsame Abendessen ist im *Gewölbekeller Buttergasse*, Alter Markt 13.

Freitag, 12.11.2004

9:30	**Michael Stiebitz (Ilmenau)** "Vizing's Theorem and a Survey of Related Results"	(G03-315)
anschließend	*Kaffeepause*	
10:45	**Tor Helleseth (Bergen (Norway))** "Crosscorrelation of m-sequences: An overview and recent results"	(G03-315)
anschließend	*Mittagspause*	
13:30 - 15:30	**Sektionsvorträge**	
15:30 - 16:00	*Kaffeepause*	
16:00 - 18:00	**Sektionsvorträge**	
19:30	*Gemeinsames Abendessen* im **Gewölbekeller Buttergasse** Alter Markt 13.	

Samstag, 13.11.2004

9:00	**Mikhail Muzychuk (Netanya (Israel))** "On isomorphism problem for Cayley graphs"	(G03-315)
anschließend	*Kaffeepause*	
10.15 - 12:15	**Sektionsvorträge**	
anschließend	*Mittagspause*	
13:45 - 14:45	**Sektionsvorträge**	
anschließend	*Kaffeepause*	
15:00	**Günter M. Ziegler (Berlin)** "Polytopes, Block Matrices, and Projections"	(G03-315)

Kurzvorträge Freitag, 12.11.2004

Zeit	Sektion I 03-315	Sektion II G03-214	Sektion III G03-106	Sektion IV G02-109	Sektion V G02-111
13:30	**H. Gropp 1** Thomas Clausen as combinatorialist	**D. Betten 2** Parallelisms of the unitals $2-(28,4,1)$	**A. Kohl 3** Partial list colorings	**F. H. Lutz 4** Random Realization of Surfaces	**K. Dohmen 5** Graph Sieves and Binomially Bounded Functions
14:00	**I. Althöfer 6** A Secretary Problem, Shortest Paths in Graphs, and Cross Connections	**J. Bierbrauer 7** Netzwerke, Codes, Designs und projektive Ebenen	**A. Kemnitz 8** $[r,s,t]$-Colorings and Hereditary Properties of Graphs	**S. Kurz 9** On the minimum diameter of plane integral point sets	**M. Kang 10** Enumeration and uniform generation of planar structures
14:30	**S. Schwarz 11** Optimal Lineups in Team Competitions	**R. Franken 12** The covering radius of long non-binary BCH codes	**S. Brandt 13** Dense triangle-free graphs are four-colourable: A solution to the Erdős-Simonovits problem	**H. Havlicek 14** My favorite 12-cap in PG(5,3)	**M. Loeffler 15** Recursive Counting and Generation of Labeled Cubic Planar Graphs
15:00	**L. K. Jørgensen16** Directed graphs related to Hadamard matrices	**D. Hertel 17** Cross-Correlation of binary Pseudorandom-Sequences	**St. Krause 18** Multicolor Euclidean Gameboard Ramsey Numbers	**U. Brehm 19** Grid polygons with point sources	**D. Kral 20** The circular chromatic index of graphs of high girth
15:30	*Kaffeepause*				
16:00	**M. Schacht 21** On the Regularity Method for Hypergraphs	**J. Quistorff 22** Slight improvements of the Singleton bound	**F. Pfender 23** Hamiltonicity, pancyclicity and forbidden subgraphs	**J. Wills 24** Equivelar Polyhedra	**25**
16:30	**M. Sonntag 26** Competition hypergraphs and strongly connected digraphs	**O. Heden 27** On the symmetry group of perfect codes	**R. Čada 28** 2-connected claw-free graphs are prism-hamiltonian	**M. Wild 29** The asymptotic number of binary n-codes and binary matroids	**H. Harborth 30** Turan Numbers for Vertices of Cube Graphs
17:00	**I. Reinbacher 31** Counting and uniform generation of wordlines	**P. Östergård 32** A New Bound for the Zero-Error Capacity Region of the Two-User Binary Adder Channel	**J. Feng 33** An efficient sufficient condition for a graph to be hamiltonian	**R. Nickel 34** The Flow Lattice of Oriented Matroids	**J.-P. Bode 35** Minimum regular rectilinear plane graph drawings
17:30	**H. Bräsel 36** H-Comparability graphs and irreducible sequences	**U. Tamm 37** Single–Error Correcting Codes for Magnetic Recording	**G. Helden 38** Each maximal planar graph with exactly two separating triangles is hamiltonian	**39**	**40**

Kurzvorträge Samstag, 13.11.2004

Zeit	Sektion I G03-315	Sektion II G03-214	Sektion III G03-106	Sektion IV G02-109	Sektion V G02-111
10:15	**V. Blinovsky 41** Maximal Set of Ideals Without Coprimes	**Ch. Richter 42** Spherical codes and Borsuk's conjecture	**Ch. Deppe 43** Searching with lies under error cost constraints	**B. Fiedler 44** Computer algebraic determination of linear preservers of groups of permutation matrices	**S. Severini 45** A conjecture about a sufficient condition for hamiltonicity
10:45	**P. Borg 46** Graphs with the Erdős-Ko-Rado Property	**R. Laue 47** Resolvable designs from the Platonians	**A. Horbach 48** Two discrete relaxations of the k-TSP	**J. de Loera 49** Real zeros of Erhart polynomials	**W. Schmid 50** A zero-sum problem and its connection to edge-disjoint cycles
11:15	**Ch. Bey 51** A dual Erdős-Ko-Rado theorem	**G. Kyureghyan 52** The Only Crooked Power Functions are $x^{2^k+2^l}$	**B. Randerath 53** Using matching techniques for exact algorithms	**J. Pfeifle 54** Coefficients and roots of Ehrhart polynomials	**W. Wenzel 55** Kotierte Graphen
11:45	**E. Harzheim 56** A construction of subsets of the reals that have a similarity decomposition	**H. Mashurian 57** On a construction of T-shift synchronization codes	**St. Hougardy 58** Sublinear Matching Algorithms	**F. Santos 59** Catalan-many associahedra	**H. Walther 60** Vertex Oblique Graphs
12:15	*Mittagspause*				
13:45	**U. Leck 61** Maximal flat antichains of minimum weight	**A. Wagler 62** On Normal Graphs and the Normal Graph Conjecture	**T. Kalinowski 63** The complexity of a problem in radiation therapy planning	**A. Paffenholz 64** Polytopes from Products	**65**
14:15	**M. Kochol 66** Reduction of the 5-flow conjecture to cyclically 6-edge-connected snarks	**I. Schiermeyer 67** On Reed's conjecture about ω, Δ and χ	**A. Schäfer 68** The "More for Less"-Paradox in Transportation Problems with Infinite-Dimensional Supply and Demand Vectors	**R. Mechtel 69** Compressed 0/1-polytopes have edge expansion at least 1	**70**

Hauptvorträge

Tor Helleseth (Bergen (Norway))	: Crosscorrelation of m-sequences: An overview and recent results
Mikhail Muzychuk (Netanya (Israel))	: On isomorphism problem for Cayley graphs
Michael Stiebitz (Ilmenau)	: Vizing's Theorem and a Survey of Related Results
Günter M. Ziegler (Berlin)	: Polytopes, Block Matrices, and Projections

Kurzvorträge

Ingo Althöfer (Jena)	: A Secretary Problem, Shortest Paths in Graphs, and Cross Connections
Dieter Betten (Kiel)	: Parallelisms of the unitals $2-(28,4,1)$
Christian Bey (Magdeburg)	: A dual Erdős-Ko-Rado theorem
Jürgen Bierbrauer (Houghton (USA))	: Netzwerke, Codes, Designs und projektive Ebenen
Vladimir Blinovsky (Bielefeld)	: Maximal Set of Ideals Without Coprimes
Jens-Peter Bode (Braunschweig)	: Minimum regular rectilinear plane graph drawings
Peter Borg (Cambridge)	: Graphs with the Erdős-Ko-Rado Property
Stephan Brandt (Ilmenau)	: Dense triangle-free graphs are four-colourable: A solution to the Erdős-Simonovits problem
Heidemarie Bräsel (Magdeburg)	: H-Comparability graphs and irreducible sequences
Ulrich Brehm (Dresden)	: Grid polygons with point sources
Roman Čada (Praha)	: 2-connected claw-free graphs are prism-hamiltonian
Christian Deppe (Bielefeld)	: Searching with lies under error cost constraints
Klaus Dohmen (Mittweida)	: Graph Sieves and Binomially Bounded Functions
Jinfeng Feng (Aachen)	: An efficient sufficient condition for a graph to be hamiltonian
Bernd Fiedler (Leipzig)	: Computer algebraic determination of linear preservers of groups of permutation matrices
Ralf Franken (Glasgow (United Kingdom))	: The covering radius of long non-binary BCH codes
Harald Gropp (Heidelberg)	: Thomas Clausen as combinatorialist
Heiko Harborth (Braunschweig)	: Turan Numbers for Vertices of Cube Graphs
Egbert Harzheim (Köln)	: A construction of subsets of the reals that have a similarity decomposition
Hans Havlicek (Wien (Austria))	: My favorite 12-cap in PG(5,3)
Olof Heden (Stockholm (Sweden))	: On the symmetry group of perfect codes
Guildo Helden (Aachen)	: Each maximal planar graph with exactly two separating triangles is hamiltonian
Doreen Hertel (Magdeburg)	: Cross-Correlation of binary Pseudorandom-Sequences
Andrei Horbach (Kiel)	: Two discrete relaxations of the k-TSP
Stefan Hougardy (Berlin)	: Sublinear Matching Algorithms
Leif K. Jørgensen (Aalborg (Denmark))	: Directed graphs related to Hadamard matrices
Thomas Kalinowski (Rostock)	: The complexity of a problem in radiation therapy planning

Mihyun Kang (Berlin)	: Enumeration and uniform generation of planar structures
Arnfried Kemnitz (Braunschweig)	: $[r, s, t]$-Colorings and Hereditary Properties of Graphs
Martin Kochol (Bratislava (Slovakia))	: Reduction of the 5-flow conjecture to cyclically 6-edge-connected snarks
Anja Kohl (Freiberg)	: Partial list colorings
Dan Kral (Berlin)	: The circular chromatic index of graphs of high girth
Stefan Krause (Braunschweig)	: Multicolor Euclidean Gameboard Ramsey Numbers
Sascha Kurz (Bayreuth)	: On the minimum diameter of plane integral point sets
Gohar Kyureghyan (Magdeburg)	: The Only Crooked Power Functions are $x^{2^k+2^l}$
Reinhard Laue (Bayreuth)	: Resolvable designs from the Platonians
Uwe Leck (Rostock)	: Maximal flat antichains of minimum weight
Mike Loeffler (Berlin)	: Recursive Counting and Generation of Labeled Cubic Planar Graphs
Jesus de Loera (z.Zt. Magdeburg)	: Real zeros of Erhart polynomials
Frank H. Lutz (Berlin)	: Random Realization of Surfaces
Haik Mashurian (Bielefeld)	: On a construction of T-shift synchronization codes
Rafael Mechtel (Berlin)	: Compressed 0/1-polytopes have edge expansion at least 1
Robert Nickel (Cottbus)	: The Flow Lattice of Oriented Matroids
Patric Östergård (Helsinki)	: A New Bound for the Zero-Error Capacity Region of the Two-User Binary Adder Channel
Andreas Paffenholz (Berlin)	: Polytopes from Products
Florian Pfender (Berlin)	: Hamiltonicity, pancyclicity and forbidden subgraphs
Julian Pfeifle (Barcelona)	: Coefficients and roots of Ehrhart polynomials
Jörn Quistorff (Berlin)	: Slight improvements of the Singleton bound
Bert Randerath (Köln)	: Using matching techniques for exact algorithms
Iris Reinbacher (Utrecht (The Netherlands))	: Counting and uniform generation of wordlines
Christian Richter (Jena)	: Spherical codes and Borsuk's conjecture
Francisco Santos (Santander (Spain))	: Catalan-many associahedra
Mathias Schacht (Berlin)	: On the Regularity Method for Hypergraphs
Andreas Schäfer (Jena)	: The "More for Less"-Paradox in Transportation Problems with Infinite-Dimensional Supply and Demand Vectors
Ingo Schiermeyer (Freiberg)	: On Reed's conjecture about ω, Δ and χ
Wolfgang A. Schmid (Graz (Austria))	: A zero-sum problem and its connection to edge-disjoint cycles
Stefan Schwarz (Jena)	: Optimal Lineups in Team Competitions
Simone Severini (York (United Kingdom))	: A conjecture about a sufficient condition for hamiltonicity
Martin Sonntag (Freiberg)	: Competition hypergraphs and strongly connected digraphs
Ulrich Tamm (Chemnitz)	: Single–Error Correcting Codes for Magnetic Recording
Annegret Wagler (Magdeburg)	: On Normal Graphs and the Normal Graph Conjecture
Hansjoachim Walther (Ilmenau)	: Vertex Oblique Graphs
Walter Wenzel (Chemnitz)	: Kotierte Graphen
Marcel Wild (Matieland (South Africa))	: The asymptotic number of binary n-codes and binary matroids
Jörg M. Wills (Siegen)	: Equivelar Polyhedra

Weitere TeilnehmerInnen

Harout Aydinian (Bielefeld), Patrick Baier (Berlin), Felix Breuer (Berlin), Cornelia Dangelmayr (Berlin), Reinhard Diestel (Hamburg), Stefan Felsner (Berlin), Dieter Gernert (München), Frank Göring (Chemnitz), Yubao Guo (Aachen), Jochen Harant (Ilmenau), Martin Henk (Magdeburg), Christoph Josten (Frankfurt), Dieter Jungnickel (Augsburg), Jacob Katriel (Haifa), Simon King (Darmstadt), Massimiliano Marangio (Salzgitter), Stephan Mertens (Magdeburg), Alexander Pott (Magdeburg), Astrid Reifegerste (Hannover), Achill Schuermann (Magdeburg), Daria Schymura (Berlin), Anusch Taraz (München), Christian Thürmann (Braunschweig), Margit Voigt (Dresden), Thomas Voigt (Berlin), Markus Wappler (Chemnitz), Arnold Waßmer (Berlin), Axel Werner (Berlin)

Freitag, 12.11.2004 — Zeit: 9:30 — G03-315

Vizing's Theorem and a Survey of Related Results

MICHAEL STIEBITZ (Ilmenau)

The cornerstones in the theory of edge colourings are Shannon's, Vizing's and Ore's bounds for the chromatic index in terms of the maximum degree and the maximum multiplicity and, moreover, the Adjacency Lemma for simple graphs as well as for multigraphs, and several generalizations of the Adjacency Lemma. In the first part of the talk we shall show that all these results have a common root. In the second part of the talk we shall discuss some recent approaches to Jakobsen's and Goldberg's conjectures.

Freitag, 12.11.2004 — Zeit: 10:45 — G03-315

Crosscorrelation of m-sequences: An overview and recent results

TOR HELLESETH (Bergen (Norway))

Binary m-sequences have many applications in coding theory, communication systems and in cryptography. In this lecture we will study the crosscorrelation bewteen m-sequences of the same period. Let $\{s(t)\}$ and $\{s(dt)\}$ be two binary m-sequences of period $2^n - 1$ that differ by a decimation d where $gcd(d, 2^n - 1) = 1$. The crosscorrelation function between two m-sequences is defined by

$$C_d(\tau) = \sum_{t=0}^{2^n-2} (-1)^{s(t+\tau)-s(dt)}.$$

It is well known that the crosscorrelation function takes on at least three distinct values when the two sequences are cyclically distinct i.e., when $d \neq 2^i \ (mod\ 2^n - 1)$ for all integers i. Several decimations d giving exactly three values are known. We will give an overview and the history of the problem to determine the crosscorrelation function between m-sequence and we will also provide some new results and open problems.

In particular, we will also give some recent results finding new values of d for which exactly four values occur. Some of the new results on 4-valued crosscorrelation are as follows: Let $n = 2k$ and let d be of the form $d = (2^k - 1)s + 1$ where $s = 2^r \cdot (2^r \pm 1)^{-1} \ (mod\ 2^k + 1)$. Let $v_2(x)$ be the largest positive integer u such that 2^u divides x. In the case when $v_2(r) < v_2(k)$ the decimations above give 4-valued crosscorrelation functions. The complete distribution of the values and the number of occurrences of each value is also calculated. We conjecture that these decimations include all 4-valued cases with $n = 2k$ and d of the form $d = (2^k - 1)s + 1$.

Samstag, 12.11.2004 — Zeit: 9:00 — G03-315

On isomorphism problem for Cayley graphs

MIKHAIL MUZYCHUK (Netanya (Israel))

Let H be a finite group. A Cayley digraph $\mathsf{Cay}(H, S), S \subseteq H$ is a digraph the node set of which is H and two nodes $x, y \in H$ are connected by an arc iff $xy^{-1} \in S$. An isomorphism problem for Cayley digraphs is formulated as follows.

Given two Cayley digraphs $\mathsf{Cay}(H, S)$ and $\mathsf{Cay}(H, T)$, determine whether or not $\mathsf{Cay}(H, S)$ and $\mathsf{Cay}(H, T)$ are isomorphic as usual digraphs.

A simple sufficient condition for isomorphism may be formulated by the aid of the following definition.

Two Cayley digraphs $\mathsf{Cay}(H, S)$ and $\mathsf{Cay}(H, T)$ are called Cayley isomorphic iff there exists a group automorphism $\varphi \in \mathsf{Aut}(H)$ such that $\mathsf{Cay}(H, S)^{\varphi} = \mathsf{Cay}(H, T)$.

It is a trivial observation that Cayley isomorphic digraphs are isomorphic as digraphs. The converse is not true in general.

The problem was originated by A.Ádám in 1967 who studied Cayley graphs over the cyclic groups (so-called, circulant graphs) and conjectured (wrongly) that two circulant graphs are isomorphic if and only if they are Cayley isomorphic. In my talk I'll present a solution of the isomorphism for circulant graphs and overview the recent progress in the solution of the general Cayley graphs isomorphism problem.

Samstag, 12.11.2004 — Zeit: 15:00 — G03-315

Polytopes, Block Matrices, and Projections

GÜNTER M. ZIEGLER (Berlin)

Geometric intuition may sometimes be strained, and sometimes plainly fail, when we try to construct "interesting" higher-dimensional geometric structures, such as iterated deformed products, and neighborly polytopes. As a substitute, I will advertise the power of matrix algebra arguments.
We will look at polytopes defined by block triangular matrices, and see that these do define deformed product polytopes. The resulting linear algebra definition of deformed products is much simpler and more general than the geometric one, as given by Amenta & Ziegler (1996).
As an application, we construct "projected products of polygons." These are quite remarkable 4-dimensional polytopes: Their *fatness* gets arbitrarily close to 9, and *complexity* arbitrarily close to 16. They generalize and extend the "neighborly cubical polytopes" by Joswig & Ziegler (2000).

Freitag, 12.11.2004 — Zeit: 13:30

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1 — Sektion I — G03-315 — 13:30

Thomas Clausen as combinatorialist

HARALD GROPP (Heidelberg)

Thomas Clausen (born in January of 1801, died in May of 1885) was a Danish astronomer who worked in Altona, München and Tartu (Estonia). He also published a lot of mathematical papers. His activity in combinatorics is not well known.
Apart from a short discussion of Clausen's biographical data my talk will focus on his possible proof of the nonexistence of two Latin squares of order 6. Moreover, I shall discuss some of his combinatorial papers on topics like Steiner systems related to work of Kirkman.
At last the relatively unknown combinatorial structure of a (partial) Knut Vik design will be discussed.
My most recent reference is:
H. Gropp, Thomas Clausen, a Danish astronomer and mathematician, in: Proceedings of the 8th Nordic Combinatorial Conference, (eds. L.D. Andersen, O. Geil),Aalborg (2004), 71-81.

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2 — Sektion II — G03-214 — 13:30

Parallelisms of the unitals $2-(28,4,1)$

DIETER BETTEN (Kiel)

A $2-(28,4,1)$ design consists of 28 points, 63 subsets of length 4 (called blocks) such that each pair of points is on exactly one block. A parallel class consists of 7 pairwise disjoint blocks, and a parallelism (or resolution) is a partitioning of the block set into 9 parallel classes. We study these $2-(28,4,1)$ unitals using tactical decompositions and computer methods. We show: if the rank of the design is ≤ 26 then there exist up to isomorphism exactly 7 parallelisms. After this only the case rank $= 27$ remains unsettled.

3 — Sektion III — G03-106 — 13:30

Partial list colorings

ANJA KOHL (Freiberg)

Let G be a graph with n vertices and choice number χ_ℓ. It is a natural question to ask how many vertices of G can be colored properly from lists with fewer than χ_ℓ elements. For $1 \leq t \leq \chi_\ell$ let $\mathcal{L}_t$ be a list assignment of t colors to every vertex of G. Then we define $\lambda_t := \min_{\mathcal{L}_t}\{$maximum number of vertices of G that can be colored from the lists $\mathcal{L}_t\}$.
Albertson, Grossman and Haas conjectured $\lambda_t \geq \frac{t}{\chi_\ell} \cdot n$ for every graph G.
We summarize the work on this topic. Moreover we show that for $t = 2$ the conjecture holds for chordal, claw-free and outerplanar graphs.
Another conjecture by Albertson et al. stating that it holds $\lambda_2 \geq \frac{n}{2}$ for every planar graph will be answered for planar graphs G of girth $g \geq 4$ by using known results on the acyclic chromatic number and the decycling number of G.

4 — Sektion IV — G02-109 — 13:30

Random Realization of Surfaces

FRANK H. LUTZ (Berlin)

It is, in general, a difficult problem to decide realizability for triangulated orientable surfaces of genus $g \geq 1$. Surprisingly, for triangulations with few vertices, 3-dimensional geometric realizations (with straight edges, flat triangles, and without self-intersections) can be obtained by choosing coordinates randomly: At least 721 of the 865 vertex-minimal 10-vertex triangulations of the orientable surface of genus 2 are realizable. We present some of these examples in the talk.

5 — Sektion V — G02-111 — 13:30

Graph Sieves and Binomially Bounded Functions

KLAUS DOHMEN (Mittweida)

A *graph sieve* is a probabilistic inequality of type

$$P\left(\bigcup_{v\in V} A_v\right) \leq (\geq) \sum_{I\in\mathcal{E}} c_I P\left(\bigcap_{i\in I} A_i\right) \qquad (*)$$

where $\mathcal{E}$ is a set system associated with some graph or hypergraph on V and $c_I \in \mathbb{R}$ for any $I \in \mathcal{E}$ such that $(*)$ holds for *any* measure P and *any* P-measurable sets A_v, $v \in V$. The most prominent graph sieve is Hunter's inequality where $\mathcal{E} = V \cup E$ for some tree $G = (V, E)$ and $c_I = (-1)^{|I|-1}$ for any $I \in \mathcal{E}$. In this talk, we introduce a new class of functions, the so-called binomially bounded functions, which gives rise to graph sieves and related inequalities in a concise and unified way. We thus discover several old and new results, including the author's recent chordal graph sieve, which generalizes Hunter's inequality from trees to chordal graphs.

Freitag, 12.11.2004 — Zeit: 14:00

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6 — Sektion I — G03-315 — 14:00

A Secretary Problem, Shortest Paths in Graphs, and Cross Connections

INGO ALTHÖFER (Jena)

(1) In the secretary problem, a decider sees 100 or so candidate solutions, one after the other. He wants to select the best one with highest possible probability. This task is interesting because of a special side condition: The decider has to accept/reject a candidate solution exactly at the moment when he sees it. In total he is allowed to accept only one candidate.
(2) Normally (and easily) shortest paths in grid graphs are computed by backward analysis. However, in very large graphs sometimes forward-heuristics are used instead.
In the talk we discuss a variant of the secretary problem and a shortest-path heuristic and present and discuss some surprising cross connections.

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7 — Sektion II — G03-214 — 14:00

Netzwerke, Codes, Designs und projektive Ebenen

JÜRGEN BIERBRAUER (Houghton (USA))

Eine Version des Konstruktionsproblems für Kommunikationsnetzwerke führt zu einem designtheoretischen Überdeckungsproblem.
Bezeichne als **covering** $C(n, k, r)$ eine Familie von Teilmengen (**Blöcken**) einer n-Menge, welche das folgende erfüllt: jeder Block hat höchstens k Punkte, jeder Punkt ist in höchstens r Blöcken und je zwei Punkte sind in mindestens einem gemeinsamen Block. Das Problem ist die Konstruktion von $C(n, k, r)$ für maximales n.
Wir geben eine vollständige Lösung in einem generischen Fall ($k \geq r,\ k$ nicht zu nahe an $r,\ q = r-1$ Primpotenz). Die Konstruktion beruht auf Punktmengen in projektiven Ebenen und ist äquivalent mit 3-dimensionalen linearen Codes. Der Beweis der Optimalität benutzt eine graphentheoretische Methode, **fractional matchings.** Es bleiben offene Probleme für gewisse Parameterkonstellationen (wenn k nicht groß genug ist) sowie in einem generischen Fall, wenn nämlich projektive Ebenen der Ordnung q nicht existieren oder nicht bekannt sind, also immer wenn q eine zusammengesetzte Zahl ist. Dies führt zum Konstruktionsproblem für designtheoretische Objekte, welche projektive Ebenen approximieren. Wir beleuchten den Fall der Ordnung 6. Auch in diesem Fall erhalten wir gute coverings.

J.Bierbrauer, S. Marcugini, F.Pambianco: *Projective planes, coverings and a network problem, Designs, Codes and Cryptography* **29** (2003), 71-89.

8 — Sektion III — G03-106 — 14:00

$[r, s, t]$-Colorings and Hereditary Properties of Graphs

ARNFRIED KEMNITZ (Braunschweig)

Given non-negative integers r, s, and t, an $[r, s, t]$-coloring of a graph $G = (V(G), E(G))$ is a mapping c from $V(G) \cup E(G)$ to the color set $\{0, 1, \ldots, k-1\}$, $k \in \mathbb{N}$, such that $|c(v_i) - c(v_j)| \geq r$ for every two adjacent vertices v_i, v_j, $|c(e_i) - c(e_j)| \geq s$ for every two adjacent edges e_i, e_j, and $|c(v_i) - c(e_j)| \geq t$ for all pairs of incident vertices and edges, respectively. The $[r, s, t]$-chromatic number $\chi_{r,s,t}(G)$ of G is defined to be the minimum k such that G admits an $[r, s, t]$-coloring.
We characterize the properties $\mathcal{O}(r, s, t, k) = \{G : \chi_{r,s,t}(G) \leq k\}$ for $k = 1, 2, 3$ as well as for $k \geq 3$ and $\max\{r, s, t\} = 1$ using well-known hereditary properties. The main results for $k \geq 3$ are summarized in a diagram.

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9 — Sektion IV — G02-109 — 14:00

On the minimum diameter of plane integral point sets

SASCHA KURZ (Bayreuth)

A set of points in the Euclidean space $\mathbb{E}^2$ where all pairwise distances are integral is called an integral point set and the maximum occurring distance is its diameter. In this talk we give new exact numbers for the minium diameter of plane integral point sets and prove a bound for integral points with many collinear points. Imaginable applications lie in radio astronomy, chemistry (molecules), physics (energy quantums), robotics, architecture and other fields.

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10 — Sektion V — G02-111 — 14:00

Enumeration and uniform generation of planar structures

MIHYUN KANG (Berlin)

We consider planar structures, such as planar graphs, regular planar graphs, and outerplanar graphs. The main idea of the enumeration and uniform generation of these graphs is to decompose the graphs along their connectivity-structure.
For the uniform generation we use the so-called recursive method. We derive recursive counting formulas along the decomposition, which yields a polynomial time generation procedure to sample a graph that is uniformly distributed. For the asymptotic enumeration we interpret the decomposition in terms of generating funtions and derive the asymptotic numbers of the graphs, using singularity analysis.

Freitag, 12.11.2004 — Zeit: 14:30

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11 — Sektion I — G03-315 — 14:30

Optimal Lineups in Team Competitions

STEFAN SCHWARZ (Jena)

We consider a team competition (as in chess or table tennis) where every member of team $A = \{a_1, \ldots, a_n\}$ plays against exactly one member of team $B = \{b_1, \ldots, b_n\}$, where $a_i > 0$ and $b_i > 0$ denote the playing strength of the i-th player of team A and B, respectively. We assume that a player with strength b_j playing against a player with strength a_i gets in average $\frac{b_j}{a_i+b_j}$ points. Given $a_1 > a_2 > \cdots > a_n$ and $b_1 > \cdots > b_n$, which permutation π^* maximizes the function $\sum_{i=1}^{n} \frac{b_{\pi(i)}}{a_i+b_{\pi(i)}}$? That means, if team A is ordered by the strengths of its players, which is the order π^* of team B that maximizes the expected number of points (for B) out of n games?
We give a *complete* characterization of all permutations $\pi \in S_n$ which can be a unique global optimum for some playing strengths $a_1 > \cdots > a_n$ and $b_1 > \cdots > b_n$. We show a connection to the theory of pattern-avoiding permutations and generalize the problem to a wide class of “winning functions.

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12 — Sektion II — G03-214 — 14:30

The covering radius of long non-binary BCH codes

RALF FRANKEN (Glasgow (United Kingdom))

An upper bound for the covering radius of a primitive BCH code of sufficient length can be proved by means of elementary properties of polynomials f_0, f_1 and $F_u = f_0 + uf_1$ over a finite field. This approach was developed by S. Cohen in the mid-1990s for binary codes and combined a classic observation by T. Helleseth with Galois-theoretic ideas and counting arguments.
This talk is about the generalisation of the method to p-ary codes ($p > 2$ prime). We present an overview, including a basic version and a recent refinement of the method, the ternary case in some detail, and a summary of results obtained so far. Various aspects unknown to the binary case will be highlighted.

13 — Sektion III — G03-106 — 14:30

Dense triangle-free graphs are four-colourable: A solution to the Erdős-Simonovits problem

STEPHAN BRANDT (Ilmenau)

In 1972, Erdős and Simonovits conjectured that triangle-free graphs with n vertices and minimum degree $\delta > n/3$ are 3-colourable, and Hajnal gave a construction based on Kneser graphs, showing that for any $c < 1/3$ the chromatic number can be arbitrarily large among the triangle-free graphs with $\delta > cn$. In 1982 Häggkvist found a counterexample based on the 4-chromatic Grötzsch graph. Jin proved in 1993, that the original statement is true if $n/3$ is replaced by $10n/29$ which is sharp. Moreover he conjectured that the chromatic number can be arbitrarily large for triangle-free graphs with $\delta > n/3$. Recently, Brandt showed that 4 is an upper bound for the chromatic number of maximal triangle-free r-regular graphs with $r > n/3$, Thomassen proved that for any $c > 1/3$ the chromatic number of every triangle-free graphs with $\delta > cn$ is bounded by a constant depending on c, and Łuczak improved this statement, showing that every such graph is homomorphic with a triangle-free graph on constantly many vertices.
We prove the original problem with 4 in place of 3 by determining the homomorphically minimal subgraphs of the maximal triangle-free graphs with $\delta > n/3$. This turns out to be a minor extension of a class described by Brandt and Pisanski in 1997. This is joint work with Stéphan Thomassé, Lyon.

14 — Sektion IV — G02-109 — 14:30

My favorite 12-cap in PG(5,3)

HANS HAVLICEK (Wien (Austria))

The Veronese surface $\mathcal{V}$ in PG$(5,3)$ is a cap with thirteen points, and it contains thirteen planar quadrangles (conics). If one planar quadrangle of $\mathcal{V}$ is replaced with its diagonal triangle, then one obtains another cap, say $\mathcal{K}$, with twelve points: nine points from $\mathcal{V}$ and three points off $\mathcal{V}$. Such a cap is a point model of the small Witt design W_{12}, the blocks being those hyperplane sections of $\mathcal{K}$ which contain more than three (actually six) points of $\mathcal{K}$. Our construction yields an alternative approach to results which were obtained independently by H.S.M. Coxeter (1958) and G. Pellegrino (1973). In fact, there are various easy ways to obtain a cap, which is projectively equivalent to $\mathcal{K}$, by replacing certain points of the Veronese surface $\mathcal{V}$ with other points of its ambient space.

15 — Sektion V — G02-111 — 14:30

Recursive Counting and Generation of Labeled Cubic Planar Graphs

MIKE LOEFFLER (Berlin)

The speaker gives a talk about a deterministic polynomial time algorithm that generates a labeled cubic planar graphs uniformly at random. It is based on the so-called *recursive method*: A graph is decomposed along its connectivity structure which yields counting formulas for exact enumeration. From this we derive a uniform generation procedure that composes a graph with correct probability. Finally, counting and sampling results will be presented.

This is joint work with Manuel Bodirsky and Mihyun Kang.

Freitag, 12.11.2003 — Zeit: 15:00

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16 — Sektion I — G03-315 — 15:00

Directed graphs related to Hadamard matrices

LEIF K. JØRGENSEN (Aalborg (Denmark))

A doubly regular (m, r)-team tournament is an orientation of the complete multipartite graph with m parts of size r, such that every vertex has indegree and outdegree $k = \frac{1}{2}(m-1)r$ and for every pair x, y of distinct vertices the number of paths of length two from x to y is α if $x \to y$, β if $x \leftarrow y$ and γ otherwise, for some constants α, β and γ. We prove that there are three types of doubly regular (m, r)-team tournaments. In one of the types no examples are known. The other two cases correspond to so-called imprimitive non-symmetric association schemes with three classes. All known examples are related to either skew Hadamard matrices or "skew" Bush-type Hadamard matrices. We give one new construction.

This is joint work G. A. Jones, M. Klin and S. Y. Song.

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17 — Sektion II — G03-214 — 15:00

Cross-Correlation of binary Pseudorandom-Sequences

DOREEN HERTEL (Magdeburg)

Pseudorandom-sequences are widely used in communications and cryptology. The two common criteria for pseudorandom-sequences are to be balanced and have ideal two-level autocorrelation. Such sequences we call perfect. In the last few years, new constructions for perfect sequences have been found. In this talk we investigate the cross-correlation properties between perfect sequences. We give a lower bound for the maximal cross-correlation coefficient between arbitrary perfect sequences. We conjecture, that this bound is not best possible. Furthermore, we determine perfect sequences with provable good correlation properties. These cross-correlation spectra are 3-valued, which is also interesting for constructing perfect ternary sequenes.

18 — Sektion III — G03-106 — 15:00

Multicolor Euclidean Gameboard Ramsey Numbers

STEFAN KRAUSE (Braunschweig)

We consider Ramsey-type problems, where sequences of triangle, square, and hexagon boards are colored instead of the complete graph. We review known results for 2-colorings, and present new existence results and exact values for more than two colors.
(Joint work with Jens-P. Bode, TU Braunschweig)

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19 — Sektion IV — G02-109 — 15:00

Grid polygons with point sources

ULRICH BREHM (Dresden)

A grid polygon is a union of unit squares with vertices in the integer lattice $\mathbb{Z}^2$. We construct pairs of grid polygons having the same X-ray images from two point sources.

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20 — Sektion V — G02-111 — 15:00

The circular chromatic index of graphs of high girth

DAN KRAL (Berlin)

Several relaxation of graph coloring have been introduced and intensively studied, including a notion of circular coloring. A proper circular k-edge-coloring, for a real $k \geq 1$, is a coloring by real numbers from the interval $[0, k)$ such that the difference modulo k of the colors c_1 and c_2 assigned to incident edges is at least one, i.e., $1 \leq |c_1 - c_2| \leq k - 1$. We show that for each $\varepsilon > 0$ and each integer $\Delta \geq 1$, there exists a number g such that for any graph G of maximum degree Δ and girth at least g, the circular chromatic index of G is at most $\Delta + \varepsilon$. One of motivations for our research was a conjecture of Jaeger and Swart from 1979 that high girth cubic graphs have chromatic index three. The conjecture was disproved by Kochol in 1996, but our results imply that the conjecture is (almost) true when relaxed to circular colorings.
(joint work with T. Kaiser, R. Skrekovski and X. Zhu)

Freitag, 12.11.2004 — Zeit: 16:00

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21 — Sektion I — G03-315 — 16:00

On the Regularity Method for Hypergraphs

MATHIAS SCHACHT (Berlin)

Szemerédi's Regularity Lemma asserts that every graph can be decomposed into relatively 'few' random-like subgraphs. This random-like behavior enables one to find and enumerate subgraphs of a given isomorphism type, yielding the so called Counting Lemma. The combined application of these two lemmas, the *Regularity Method for graphs*, has proved to be useful in combinatorics, discrete geometry, combinatorial number theory, and theoretical computer science.
In my talk I report on recent advances in the regularity method for k-uniform hypergraphs. This method allows one to give alternative proofs of density versions of some combinatorial partition theorems originally obtained by E. Szemerédi, H. Furstenberg, and Y. Katznelson. These results are derived from an extremal result of purely combinatorial nature.
This is joint work with B. Nagle, V. Rödl, and J. Skokan. Similar results were obtained independently by W. T. Gowers, following a different approach.

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22 — Sektion II — G03-214 — 16:00

Slight improvements of the Singleton bound

JÖRN QUISTORFF (Berlin)

The problem of determining $A_q(n,d)$, the maximum cardinality of a q-ary code of length n with minimum distance at least d, is considered in some cases where corresponding MDS codes do not exist. Slight improvements of the Singleton bound are given, including $A_q(q+2,q) \leq q^3 - 3$ if q is odd, $A_5(7,5) \leq 5^3 - 4$ and $A_{16}(18,15) \leq 18^4 - 4$.

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23 — Sektion III — G03-106 — 16:00

Hamiltonicity, pancyclicity and forbidden subgraphs

FLORIAN PFENDER (Berlin)

For a family of graphs $\mathcal{F}$, a graph G is said to be $\mathcal{F}$-free if it contains no member of $\mathcal{F}$ as an induced subgraph. There are numerous results showing that all 2-connected $\mathcal{F}$-free graphs are hamiltonian or pancyclic, respectively, for certain families $\mathcal{F}$. In the same spirit, we will exhibit similar results about 3-connected graphs in this talk.

24 — Sektion IV — G02-109 — 16:00

Equivelar Polyhedra

JÖRG M. WILLS (Siegen)

25 — Sektion V — G02-111 — 16:00

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Freitag, 12.11.2004 — Zeit: 16:30

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26 — Sektion I — G03-315 — 16:30

Competition hypergraphs and strongly connected digraphs

MARTIN SONNTAG (Freiberg)

In 1995, K.F. Fraughnaugh, J.R. Lundgren, S.K. Merz, J.S. Maybee and N.J. Pullman characterized the competition graphs belonging to strongly connected digraphs. We demonstrate that this result cannot be generalized to competition hypergraphs.
Furthermore, for a given (not strongly connected) digraph D we deal with the construction of digraphs D' having the same competition hypergraph but less strongly connected components.

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27 — Sektion II — G03-214 — 16:30

On the symmetry group of perfect codes

OLOF HEDEN (Stockholm (Sweden))

By using the Krotov construction of perfect 1-error correcting binary codes, we show that for any length $n = 2^k - 1$ where $k \geq 8$ and for any rank r with $n - \log(n+1) + 4 \leq r \leq n - 4$, there is a perfect code with these parameters and with a trivial group of symmetries.

We also take the opportunity to present a full rank perfect 1-error correcting binary code of length 31 with a kernel of dimension 21. This was the last open case of the *rank-kernel problem* of Etzion and Vardy.

28 — Sektion III — G03-106 — 16:30

2-connected claw-free graphs are prism-hamiltonian

ROMAN ČADA (Praha)

The prism over a graph G is the Cartesian product of G and K_2. It was proved by Kaiser et all [1] that the prism over a 2-connected line graph is hamiltonian. We extend the result to the class of 2-connected claw-free graphs. The work has been done during postdoc at LRI, Orsay, France.

[1] T.Kaiser, D.Kral', M.Rosenfeld, Z.Ryjáček, H.-J. Voss: Hamilton cycles in prisms over graphs, ITI Series No. 127, 2003 (to appear).

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29 — Sektion IV — G02-109 — 16:30

The asymptotic number of binary n-codes and binary matroids

MARCEL WILD (Matieland (South Africa))

Let $b(n)$ be the number of nonequivalent binary n-codes. This also is the number of nonisomorphic binary n-matroids. If $G(n,2)$ is the number of all subspaces of the vector space $GF(2)^n$ and log is the logarithm to base 2, then

$$\left(1+2^{-\frac{n}{2}+2\log n+1.2499}\right)\frac{G(n,2)}{n!} \ \leq\ b(n)\ \leq\ \left(1+2^{-\frac{n}{2}+2\log n+1.2501}\right)\frac{G(n,2)}{n!}$$

for all large enough n. Strange enough, the numbers 1.2499 and 1.2501 *cannot* be replaced by $1.25\pm\varepsilon$.

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30 — Sektion V — G02-111 — 16:30

Turan Numbers for Vertices of Cube Graphs

HEIKO HARBORTH (Braunschweig)

For given graphs G and H the Turan number (for edges) is the maximum number of edges chosen in G such that no subgraph H in G contains chosen edges only. For complete graphs G and H the classical Turan numbers are known since 1940. If G is the cube graph Q_n and H is $Q_2 = C_4$ then we have an unsolved problem of P. Erdős. Here it is proposed to consider Turan numbers for vertices instead of edges in the case of cube graphs $G = Q_n$ and $H = Q_m$. These vertex Turan numbers are determined for $m = 2$ completely and in some other cases.

This is joint work with Hauke Nienborg.

Freitag, 12.11.2004 — Zeit: 17:00

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31 — Sektion I — G03-315 — 17:00

Counting and uniform generation of wordlines

IRIS REINBACHER (Utrecht (The Netherlands))

Given is a discrete 2D-space (x-axis ... space, t-axis ... time) and a configuration (cluster) of possible transitions between two adjacent positions in space at a certain time t (hops).
Definition: A *worldline* is a path, moving only forward in time, starting at position $(x, t = 0)$ and ending at position $(x, t' > t)$, which can move to adjacent space positions $x \pm 1$ if and only if there is a hop between x and $x \pm 1$.
Find a configuration of k nonoverlapping worldlines uniformly distributed over all possible configurations.

We can count the number of possible configurations of k worldlines by using a dynamic programming approach in $O(2^k n^{k+1})$ time. However, as k can be as large as $n/2$, this remains an exponential algorithm and is therefore unusable in practice.
Question: Is there a more efficient way to count all possible worldline configurations?

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32 — Sektion II — G03-214 — 17:00

A New Bound for the Zero-Error Capacity Region of the Two-User Binary Adder Channel

PATRIC ÖSTERGÅRD (Helsinki)

New uniquely decodable (UD) codes for the two-user binary adder channel (BAC) are presented. These codes lead to an improved bound for the zero-error capacity region of such a channel. The highest known rate for a UD code for the two-user BAC is thereby improved to $(\log_2 640)/7 \approx 1.3317$. It is also demonstrated that the problem of finding UD codes for the closely related binary XOR channel is in one-to-one correspondence with a certain construction of binary one-error-correcting codes.

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33 — Sektion III — G03-106 — 17:00

An efficient sufficient condition for a graph to be hamiltonian

JINFENG FENG (Aachen)

Let $G = (V, E)$ be a 2-connected simple graph and let $d_G(u, v)$ denote the distance between two vertices u, v in G. In this paper, it is proved: If the inequality $d_G(u) + d_G(v) \geq |V(G)| - 1$ holds for each pair of vertices u and v with $d_G(u, v) = 2$, then G is hamiltonian, unless G belongs to an exceptional class of graphs. The latter class is described in this paper. Our result implies the theorem of O. Ore (*Amer. Math. Monthly* **67** (1960), 55). However, it is not included in the theorem of G. Fan (*J. Combin. Theory Ser. B* **37** (1984), 221–227).

34 — Sektion IV — G02-109 — 17:00

The Flow Lattice of Oriented Matroids

ROBERT NICKEL (Cottbus)

Recently Hochstättler and Nešetřil introduced the flow lattice of an oriented matroid as generalization of the lattice of all integer flows of a digraph or more general a regular matroid. This lattice is defined as the integer hull of the characteristic vectors of signed circuits.
We characterize the flow lattice of an oriented matroid $\mathcal{O}$ for the cases that $\mathcal{O}$ is uniform or has rank 3. For both cases we determine the dimension of the lattice and give a complete characterization including the construction of a basis of signed circuits. We prove that in the uniform case the dimension is $n-1$ iff the matroid is reorientation equivalent to a neighborly matroid polytope of odd rank. Hereby we partially solve a problem stated in the famous book of Björner, Las Vergnas, Sturmfels, White and Ziegler about oriented matroids.

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35 — Sektion V — G02-111 — 17:00

Minimum regular rectilinear plane graph drawings

JENS-PETER BODE (Braunschweig)

Every planar graph can be drawn in the plane with nonintersecting edges (plane drawing). Moreover, this is possible using straight line segments for all edges (rectilinear plane drawings). As further restrictions one may ask the edges to be of equal length or to use integral lengths only. Here we will consider r-regular graphs and ask for the smallest examples using at most a given number s of edge lengths in its rectilinear plane drawing. Common work with Heiko Harborth and Christian Thürmann.

Freitag, 12.11.2004 — Zeit: 17:30

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36 — Sektion I — G03-315 — 17:30

H-Comparability graphs and irreducible sequences

HEIDEMARIE BRÄSEL (Magdeburg)

Any acyclic orientation of the Hamming graph $K_n \times K_m$ represents a feasible solution (sequence) of the so-called open-shop problem, where n jobs have to be processed on m machines. A vertex of the Hamming graph corresponds to an operations (ij) (job i on machine j) with processing time p_{ij}. An optimal solution of the considered open-shop is an acyclic orientation of the Hamming graph with minimal weight of a critical path (makespan).
A sequence is called irreducible if there does not exist for each choice of processing times a very same better sequence, i e. the set of all irreducible sequences contains all candidates for the global optimal solution independend of the processing times.
The underlaying graph of the transitive closure of a sequence belongs to the set of all subgraphs of $K_{n \cdot m}$, which contain the $K_n \times K_m$ and which are comparability graphs (H-comparability graphs). We present properties of H-comparability graphs and show their application to irreducible sequences.

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37 — Sektion II — G03-214 — 17:30

Single–Error Correcting Codes for Magnetic Recording

ULRICH TAMM (Chemnitz)

A splitting $(\mathcal{M}, \mathcal{S})$ of an additive Abelian group $\mathcal{G}$ consists of a set of integers $\mathcal{M}$ and a subset $\mathcal{S} \subset \mathcal{G}$ such that every nonzero element $g \in \mathcal{G}$ can be uniquely written as $m \cdot h$ for some $m \in \mathcal{M}$ and $h \in \mathcal{S}$. Splittings by $\mathcal{M} = \{\pm 1, \ldots, \pm k\}$ correspond to perfect k–shift codes introduced by Levenshtein and Vinck in the analysis of run–length limited codes correcting single peak shifts – an error model important in magnetic recording. We shall determine the set $\mathcal{S}$ for several splittings of cyclic groups Z_p, p prime and also consider nonperfect shift codes.

38 — Sektion III — G03-106 — 17:30

Each maximal planar graph with exactly two separating triangles is hamiltonian

GUILDO HELDEN (Aachen)

A classical result of Whitney states that each maximal planar graph without separating triangles is hamiltonian, where a separating triangle is a triangle whose removal separates the graph. Chen (J. Comb. Optim. **7** (2003), 79-86) proved that any maximal planar graph with only one separating triangle is still hamiltonian. In this talk it is shown that the conclusion of Whitney's theorem still holds if there are exactly two separating triangles.

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39 — Sektion IV — G02-109 — 17:30

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40 — Sektion V — G02-111 — 17:30

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Samstag, 13.11.2003 — Zeit: 10:15

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41 — Sektion I — G03-315 — 10:15

Maximal Set of Ideals Without Coprimes

VLADIMIR BLINOVSKY (Bielefeld)

We prove that for all sufficiently large N_0 the maximal set of ideals of the maximal order of the algebraic number field, s.t. any pair of ideals from the set is not coprime and norm of each ideal does not exceed N_0 is the set $E(N_0) = \{\theta : \ N(\theta) \leq N_0, \ \theta = \eta_1 u\}$, where $\eta_1, \eta_2, \ldots$ is the set of prime ideals of the maximal order and $N(\eta_3) > 2$.

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42 — Sektion II — G03-214 — 10:15

Spherical codes and Borsuk's conjecture

CHRISTIAN RICHTER (Jena)

Borsuk's famous conjecture of 1933 asks whether every bounded set of positive diameter in $\mathbb{R}^n$ can be partitioned into at most $n + 1$ sets of smaller diameter. Believed by many to be true for some decades, but proved only for $n \leq 3$, it came as a surprise when Kahn and Kalai presented first (high-dimensional) counterexamples in 1993. At present, Borsuk's conjecture is disproved for all dimensions $n \geq 298$. The counterexamples of smallest dimensions n are constructed by the aid of spherical codes based on an idea of Hinrichs (see A. Hinrichs, C. Richter, New sets with large Borsuk numbers, Discrete Math. 270 (2003), 137-147).

43 — Sektion III — G03-106 — 10:15

Searching with lies under error cost constraints

CHRISTIAN DEPPE (Bielefeld)

The Rény-Berlekamp-Ulam game is a classical model for the problem of determining the minimum number of queries to find an unknown number in a finite set when up to a finite number of the answers may be erroneous. In the variant considered in this paper, questions with q many possible answers are allowed, with q fixed and known beforehand; further, lies are constrained by a weighted bipartite graph (the "channel"). The channel is an arbitrary, though fixed assignment stipulating the cost of the different possible lies, i.e., of each answer $j \neq i$ when the correct answer would be i. It is also assumed that a maximum cost e (sum of the cost of all the mendacious answers) can be afforded by the responder during the whole game. We provide a tight asymptotic estimate for the number of questions needed to solve this problem. Our results are constructive, and the appropriate searching strategies are actually provided. We also show that adaptiveness can be dramatically reduced when the channel satisfies certain symmetry constraints.

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44 — Sektion IV — G02-109 — 10:15

Computer algebraic determination of linear preservers of groups of permutation matrices

BERND FIEDLER (Leipzig)

Let $\mathbf{S}_n$ be the group of all $n \times n$ permutation matrices. For $n = 5, \ldots, 10$ we determine all subgroups $\mathbf{G} \subseteq \mathbf{S}_n$ for which the real linear space $\mathcal{L}\mathbf{G}$ spanned by $\mathbf{G}$ satisfies $\mathcal{L}\mathbf{G} = \mathcal{L}\mathbf{S}_n$. For all such $\mathbf{G}$ we search for subgroups of the group Π of all linear mappings $\phi : \mathcal{L}\mathbf{S}_n \to \mathcal{L}\mathbf{S}_n$ which fulfil $\phi(\mathbf{G}) = \mathbf{G}$ (linear preserver of $\mathbf{G}$). In general we obtain subgroups $\tilde{\Pi}_{cl} \subseteq \Pi$ which are generalizations of the "groups of classical type" in the sense of Brualdi. For $n = 5, 7, 8, 9$ there exist subgroups $\mathbf{G}$ of order $|\mathbf{G}| = n(n-1)$ whose group Π contains a wreath product
$\mathcal{S}_n \wr \mathcal{S}_{n-1}$ which is much bigger than $\tilde{\Pi}_{cl}$. However, $\mathbf{S}_9$ yields also examples of subgroups $\hat{\mathbf{G}}$ of order $|\hat{\mathbf{G}}| = n(n-1)$ for which $\mathcal{L}\hat{\mathbf{G}} \neq \mathcal{L}\mathbf{S}_n$.
Our investigations are based on an isomorphism $\varphi : \mathfrak{s}_n \to \mathcal{L}\mathbf{S}_n$ between $\mathcal{L}\mathbf{S}_n$ and a two-sided ideal $\mathfrak{s}_n \subset \mathbb{R}\mathcal{S}_n$ of the real group ring $\mathbb{R}\mathcal{S}_n$ of the symmetric group $\mathcal{S}_n$. The ideal $\mathfrak{s}_n$ is the direct sum $\mathfrak{s}_n = \mathfrak{a}_{(n)} \oplus \mathfrak{a}_{[n-1,1)}$ of two minimal two-sided ideals characterized by the partitions (n) , $(n-1, 1) \vdash n$. Furthermore we use extensive computers. We apply many tools of the package GAP and discrete Fourier transforms of $\mathcal{S}_n$ implemented in our Mathematica package PERMS.

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45 — Sektion V — G02-111 — 10:15

A conjecture about a sufficient condition for hamiltonicity

SIMONE SEVERINI (York (United Kingdom))

A novel combinatorial condition for a graph (directed or undirected) to have an Hamilton cycle is conjectured. Some partial results towards the validation of the conjecture are given.

This is joint work with G. Gutin, A. Rafiey and A. Yeo

Samstag, 13.11.2004 — Zeit: 10:45

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46 — Sektion I — G03-315 — 10:45

Graphs with the Erdős-Ko-Rado Property

PETER BORG (Cambridge)

Let G be a graph, and let r be a positive integer. We denote the family of independent r-sets of G by $I^{(r)}(G)$. Let $I_v^{(r)}(G) := \{A \in I^{(r)}(G) : v \in A\}$, and call such a family a $star$. An $anomalous$ subfamily of $I^{(r)}G$ is an intersecting subfamily that is not a subfamily of any star. G is said to be ($strictly$) r-EKR if the largest star is (strictly) larger than any anomalous subfamily. The Erdős-Ko-Rado theorem states that if E_n is the empty graph of order n, then E_n is r-EKR for $n \geq 2r$ and strictly so for $n > 2r$. A survey of other such results for some particular classes of graphs will be given.

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47 — Sektion II — G03-214 — 10:45

Resolvable designs from the Platonians

REINHARD LAUE (Bayreuth)

Some subgroups of $PSL(2, q)$ are known as Icosahedral, Octahedral, Dihedral groups. Their permutation representation on the projective line decomposes into orbits on which they act as automorphism groups of Icosahedra, Dodecahedra, Cubes, Octahedra, Dihedra, Bi-Cycles and other solids obtained from them. By selecting orbits of a small subgroup one can form blocks of 3-designs that are resolvable and admit $PSL(2, q)$ as a block transitive group of automorphisms. The big Witt design comes from the truncated cube in this way.

48 — Sektion III — G03-106 — 10:45

Two discrete relaxations of the k-TSP

ANDREI HORBACH (Kiel)

The problem to find in a given graph $G = (V, E)$ with a given weight vector $c \in E$ and integer k a simple cycle of minimum weight visiting k nodes is the the k-traveling salesman problem, or the k-TSP. To obtain lower bounds for the traveling salesman problem 2-matchings relaxation and 1-trees relaxation can be used. We generalize these discrete relaxations on the k-TSP.

49 — Sektion IV — G02-109 — 10:45

Real zeros of Erhart polynomials

JESUS DE LOERA (z.Zt. Magdeburg)

The Ehrhart polynomial of a convex lattice polytope counts integer points in integral dilates of the polytope. We prove that all real roots of these polynomials lie in the interval [-d, d/2). In contrast, we prove that when the dimension d is not fixed the positive real roots can be arbitrarily large. This is joint work with M. Beck, M. Develin, J. Pfeifle and R.P.Stanley.

50 — Sektion V — G02-111 — 10:45

A zero-sum problem and its connection to edge-disjoint cycles

WOLFGANG A. SCHMID (Graz (Austria))

Investigations of quantitative aspects of non-unique factorization in rings of algebraic integers give rise to zero-sum problems in finite abelian groups (the class groups of the number fields). In this talk results related to the counting function of integers with factorizations of at most k different lengths (introduced by W. Narkiewicz) are presented. We focus on the case where the class group is an elementary 2-group. The zero-sum problem can be stated in the following way:
Let $(G, +)$ be an elementary 2-group with rank r and $G_0 = \{e_1, \ldots, e_r\} \cup \{0\}$, where $\{e_i\}_{i=1}^r$ is independent. What is the maximal length of a sequence $S = g_1 \ldots g_n \in G \setminus G_0$ such that all zero-sum sequences consisting of S and elements in G_0 have factorizations (into minimal zero-sum sequences) of at most k different lengths? We show that this problem is equivalent to the problem of determining the maximal number of edges in a graph (on r vertices) without k edge disjoint cycles. Moreover, we use this equivalence and known results on the graph theoretic problem to answer a question of J. Śliwa on the above counting function.

Samstag, 13.11.2004 — Zeit: 11:15

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51 — Sektion I — G03-315 — 11:15

A dual Erdős-Ko-Rado theorem

CHRISTIAN BEY (Magdeburg)

The well known Erdős-Ko-Rado theorem determines the maximum size of a family of k-subsets of an n-set containing no two disjoint sets (i.e. a family which avoids the k-th adjacency relation in the Johnson graph). Here we determine the minimum size of a nonempty family of k-subsets which avoids the k-th eigenspace of the Johnson graph (i.e. has zero projection on it).

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52 — Sektion II — G03-214 — 11:15

The Only Crooked Power Functions are $x^{2^k+2^l}$

GOHAR KYUREGHYAN (Magdeburg)

We show, that the only power functions x^d in $\mathbb{F}_{2^n},\ n$ odd, such that $\{(x+a)^d + x^d : x \in \mathbb{F}_{2^n}\}$ are affine subplanes, are the quadratic maps $x^{2^k+2^l}$ with $(k-l, n) = 1$.

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53 — Sektion III — G03-106 — 11:15

Using matching techniques for exact algorithms

BERT RANDERATH (Köln)

There are many graph-theoretic and satisfiability-type problems which are known to be NP-complete. Unless $P = NP$, we cannot expect polynomial time algorithms for these problems. Since these problems often have interesting applications and it is widely believed that Cooks question, whether $P \neq NP$, has an affirmative answer, the design and analysis of fast super-polynomial time algorithms is an important task. For some problems it is possible to design algorithms that are significantly faster than exhaustive search, though still not running in polynomial time. The term exact algorithm is a shorthand for a fast exponential time algorithm. In this talk we will present exact algorithms for a well-known special satisfiability problem X3SAT and for the domination problem. Both algorithms hardly rely on the usage of matching techniques. The talk is based on joint work with E. Speckenmeyer, S. Porschen and I. Schiermeyer.

54 — Sektion IV — G02-109 — 11:15

Coefficients and roots of Ehrhart polynomials

JULIAN PFEIFLE (Barcelona)

The Ehrhart polynomial of a convex lattice polytope P counts the number of integer points in integral dilates of P. We will discuss what information about P can be obtained by expanding the Ehrhart polynomial in different bases, and give bounds on the possible location of the roots of Ehrhart polynomials in the complex plane and on the real line. We close by discussing the Ehrhart polynomials of lattice tetrahedra with few interior points.

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55 — Sektion V — G02-111 — 11:15

Kotierte Graphen

WALTER WENZEL (Chemnitz)

In der Darstellenden Geometrie gibt es das Verfahren der “Kotierten Projektion”, das aus einer Normalprojektion des Anschauungsraumes auf eine – in der Regel horizontale – Bildebene sowie der Angabe der orientierten Abstände der Urbildpunkte zu dieser Ebene besteht. Diese Abstände werden als Koten bezeichnet. Es liegt nahe, solch ein Verfahren auch für Diskrete Strukturen zu studieren; so kann man etwa das Gitter aller Punkte im Anschauungsraum mit lauter ganzzahligen Koordinaten betrachten und jedem Gitterpunkt seine dritte Koordinate als Kote zuordnen. Diese Kotierung hat nun die Eigenschaft, daß sie auf jedem – im graphentheoretischen Sinne – kürzesten Weg zwischen zwei vorgegebenen Gitterpunkten monoton ist.
Für die Diskrete Optimierung scheint es nun sinnvoll zu sein, allgemeiner – endliche und zusammenhängende – Graphen mit einer auf der Vertexmenge definierten reellen Funktion zu betrachten, die auf jedem kürzesten Weg monoton ist. In dem Vortrag sollen Klassifikationen der auf diese Weise definierten “Kotierten Graphen” für diverse Klassen von Graphen vorgestellt werden.

Samstag, 13.11.2004 — Zeit: 11:45

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56 — Sektion I — G03-315 — 11:45

A construction of subsets of the reals that have a similarity decomposition

EGBERT HARZHEIM (Köln)

A subset T of the set R of the reals is said to have a similarity decomposition, if T can be decomposed into $c := |R|$ disjoint subsets, which all have the same ordertype as T. In 1953 Seymour Ginsburg (Trans. Amer. Math. Soc. 74 (1953), page 516) raised the question whether there exist subsets of R which have a similarity decomposition and which have an ordertype less than that of R (i.e. R is not order-isomorphic to a subset of them). Using the continuum hypothesis CH we prove that such sets do exist.

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57 — Sektion II — G03-214 — 11:45

On a construction of T-shift synchronization codes

HAIK MASHURIAN (Bielefeld)

An interesting class of synchronization codes constitute the so-called bidirectional T-shift synchronization codes. They are defined to be block codes of lengh n capable of correcting synchronization shifts of length at most $T(n)$ in either direction (left or right). In the case when only shifts in one direction are allowed, one speaks of unidirectional T-shift synchronization codes. Here we give a construction of unidirectional and bidirectional T-shift synchronization codes and prove lower and upper bounds on the maximal cardinality of such codes. An infinite number of the constructed codes turn out to be asymptotically optimal when the maximal shift length $T(n)$ has an order of growth O$(n^{1-\epsilon})$ with $\epsilon > 0$.

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58 — Sektion III — G03-106 — 11:45

Sublinear Matching Algorithms

STEFAN HOUGARDY (Berlin)

The weighted matching problem is to find a matching of maximum weight in an edge weighted graph. Edmonds presented in 1965 the first polynomial time algorithm for this problem. The fastest weighted matching algorithm known today has a running time of $O(mn + n^2 \log n)$. Many real world applications require faster matching algorithms. Several linear time approximation algorithms for the weighted matching problem are known. In this talk we will show that an arbitrarily good approximation of a maximum weight matching can be computed in polylogarithmic time using polynomially many processors. This result is joint work with D.Drake.

59 — Sektion IV — G02-109 — 11:45

Catalan-many associahedra

FRANCISCO SANTOS (Santander (Spain))

To each triangulation T of a convex n-gon we associate a realization in $\mathbb{R}^{n-3}$ of the $(n-3)$-dimensional associahedron, with the following properties:

1. All facet normals are $0/1$ vectors, except for the $n-3$ corresponding to the diagonals present in T, which are the negative standard basis vectors.
2. The facet normals of the $n-3$ diagonals that can be flipped-in in T are the standard basis vectors. In particular, each of these associahedra has $n-3$ pairs of parallel facets.
3. Two triangulations produce affinely isomorphic associahedra if and only if they have the same adjacency tree between triangles.

The construction generalizes the associahedra of Fomin and Zelevinskii, in which the triangulation T used is the "snake" or "zig-zag".

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60 — Sektion V — G02-111 — 11:45

Vertex Oblique Graphs

HANSJOACHIM WALTHER (Ilmenau)

For an undirected simple graph $G(V,E)$ let $\delta(G) = d_1 < d_2 < \ldots < d_s = \Delta(G)$ be the s degrees of the vertices of G. For a vertex $x \in V(G)$ of degree $d(x) = d_i$, $i \in \{1, 2, \ldots, s\}$, we define the *type* $t(x)$ as an s-tuple $\langle \alpha_1(x), \alpha_2(x), \ldots, \alpha_s(x) \rangle$ with $\alpha_j(x)$ being the number of neighbours of x of degree d_j ($\sum_{j=1}^{s} \alpha_j(x) = d(x)$). G is *oblique* if no two vertices of G have the same type (obviously, an oblique graph has a trivial automorphism group).
It is constructed a sequence $\{H_i\}_{i=1,2,\ldots}$ of oblique graphs such that H_i and its complement $\overline{H}_i$ have the same set of types and both have connectivity $\kappa(H_i) = \kappa(\overline{H}_i) = 2 + 3 \cdot 2^{i-1}$.
A. Farrugia constructed, based on a construction of selfcomplementary graphs by Harary and others, such a sequence of graphs but only of connectivity 2.

Samstag, 13.11.2004 — Zeit: 13:45

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61 — Sektion I — G03-315 — 13:45

Maximal flat antichains of minimum weight

UWE LECK (Rostock)

We consider flat antichains (FA) in the Boolean lattice B^n, i.e. collections $\mathcal{A} = \mathcal{A}_{k+1} \cup \mathcal{A}_k$ with $\mathcal{A}_{k+1} \subseteq \binom{[n]}{k+1}$, $\mathcal{A}_k \subseteq \binom{[n]}{k}$, $A \not\subseteq B$ for $A, B \in \mathcal{A}$, $A \neq B$. We study the problem $w(\mathcal{A}) := |\mathcal{A}_1| + \lambda|\mathcal{A}_2| \mapsto \min$, where n, k and $\lambda \in I\!R^+$ are fixed and the optimization is over all maximal flat antichains (MFA). For $k = 2$ and large λ the problem turns out to be equivalent to the (6,3)-problem of Ruzsa and Szemerédi, and for $k = 2$, $\lambda = 1$, to maximizing $e - t$ over all graphs on n vertices with t edges and t triangles in which every edge is contained in a triangle. We solve the problem exactly for the latter case and asymptotically for $k = 2$, $\lambda \geq 3/n$. For the case of squashed maximal flat antichains (SMFA), we give an exact solution for any n, k, λ. Our interest in FA is motivated by the Flat Antichain Theorem, which states that for every antichain in B^n there exists a FA of the same size and with the same volume $\sum_{A\in\mathcal{A}} |A|$, and by the fact that among all antichains of a given size a minimum weight ideal is generated by a SMFA.
This is joint work with M. Grüttmüller, S. Hartmann, T. Kalinowski and I.T. Roberts.

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62 — Sektion II — G03-214 — 13:45

On Normal Graphs and the Normal Graph Conjecture

ANNEGRET WAGLER (Magdeburg)

Normal graphs are defined in terms of cross-intersecting set families: a graph is normal if it admits a clique cover $\mathcal{Q}$ and a stable set cover $\mathcal{S}$ s.t. every clique in $\mathcal{Q}$ intersects every stable set in $\mathcal{S}$.
Normal graphs can be considered as closure of perfect graphs by means of co-normal products (Körner 1973) and graph entropy (Cziszár et al. 1990). Perfect graphs have been recently characterized as those graphs without odd holes and odd antiholes as induced subgraphs (Strong Perfect Graph Theorem, Chudnovsky et al. 2002). Körner and de Simone observed that C_5, C_7, and $\overline{C}_7$ are minimal not normal and conjectured, in analogy to the Strong Perfect Graph Theorem, that every C_5, C_7, $\overline{C}_7$-free graph is normal (Normal Graph Conjecture, Körner and de Simone 1999).
We discuss this conjecture and verify it for a first graph class, the circulant graphs, by characterizing all the normal circulant graphs.

63 — Sektion III — G03-106 — 13:45

The complexity of a problem in radiation therapy planning

THOMAS KALINOWSKI (Rostock)

Intensity maps are nonnegative matrices describing the intensity modulation of beams in radiotherapy. In order to use a multileaf collimator in the static mode for the realization of the intensity modulation one has to determine a representation of an intensity map as a positive combination of special $(0, 1)-$matrices called segments. We consider the problem to construct segmentations with the minimal total number of monitor units and the minimal number of segments. Neglecting machine–dependent constraints like the interleaf collision constraint and assuming that the entries of the intensity map are bounded by a constant, we prove that a segmentation with minimal number of segments under the condition that the number of monitor units is minimal, can be determined in time polynomial in the matrix dimensions. The results of our algorithm are compared with Engel's heuristic for the reduction of the number of segments.

64 — Sektion IV — G02-109 — 13:45

Polytopes from Products

ANDREAS PAFFENHOLZ (Berlin)

In 2003, Eppstein, Kuperberg, and Ziegler presented a new method for the construction of 2-simple and 2-simplicial 4-polytopes. Paffenholz and Ziegler extended the construction to CW spheres in arbitrary dimensions.
In my talk I will introduce a new family E_{mn} of CW spheres that can be obtained from this construction applied to products $C_m \times C_n$ of polygons with m and n vertices, $m, n \geq 3$. I will prove that all these spheres are in fact polytopal and show flexible geometric realisations. In particular, E_{44} is the 24-cell.
For small m, n I present "symmetric" realisations of these polytopes. In contrast, for $m, n \geq 5$ and relatively prime I will exhibit combinatorial symmetries that cannot be realised geometrically.

65 — Sektion V — G02-111 — 13:45

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Samstag, 13.11.2004 — Zeit: 14:15

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66 — Sektion I — G03-315 — 14:15

Reduction of the 5-flow conjecture to cyclically 6-edge-connected snarks

MARTIN KOCHOL (Bratislava (Slovakia))

A graph admits a nowhere-zero k-flow if its edges can be oriented and assigned values $\pm 1, \ldots, \pm(k-1)$ so that the sum of the incoming values equals the sum of the outcoming ones for every vertex of the graph. The 5-Flow Conjecture of Tutte is that every bridgeless graph has a nowhere-zero 5-flow. We introduce a linear algebra approach to flow problems and show that a smallest counterexample to the 5-Flow Conjecture of Tutte must be a cyclically 6-edge-connected cubic graph.

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67 — Sektion II — G03-214 — 14:15

On Reed's conjecture about ω, Δ and χ

INGO SCHIERMEYER (Freiberg)

For a given graph G, the clique number $\omega(G)$, the chromatic number $\chi(G)$ and the maximum degree $\Delta(G)$ satisfy $\omega(G) \leq \chi(G) \leq \Delta(G) + 1$. In 1941 Brook's has shown that complete graphs and odd cycles are the only graphs attaining the upper bound $\Delta(G) + 1$.

In 1998 Reed posed the following conjecture:

Conjecture For any graph G of maximum degree Δ,

$$\chi(G) \leq \lceil \frac{\Delta + 1 + \omega}{2} \rceil.$$

The Chvátal graph, the smallest 4-regular, triangle-free graph of order 12 with chromatic number 4, shows that the rounding up in this conjecture is necessary. In this talk we will present some old and new partial solutions for this conjecture.

68 — Sektion III — G03-106 — 14:15

The “More for Less”-Paradox in Transportation Problems with Infinite-Dimensional Supply and Demand Vectors

ANDREAS SCHÄFER (Jena)

Recently Deineko, Klinz, and Woeginger [DKW 2003] have shown that a transportation problem is immune against the more for lessparadox if and only if the finite cost matrix does not contain a bad quadruple. We present related results for the transportation problem with infinite-dimensional supply and demand vectors: a counter-example and a best possible weaker characterisation by bad quadruples is given. As a side result a smooth inequality is obtained for the situation where a transportation plan is split in two or more arbitrary subplans.

This is joint work with I. Althoefer.

[DKW 2003] V. Deneko, B. Klinz, G.J. Woeginger, *Which Matrices are immune against the Transportation Paradox?, Discrete Applied Mathematics* **130** (2003) 495–501.

[AS 2004] I. Althoefer, A. Schaefer, *The “More for Less”-Paradox in Transportation Problems with Infinite-Dimensional Supply and Demand Vectors*,
http://www.minet.uni-jena.de/preprints/althoefer_04/althofer.pdf

69 — Sektion IV — G02-109 — 14:15

Compressed 0/1-polytopes have edge expansion at least 1

RAFAEL MECHTEL (Berlin)

Compressed 0/1-Polytopes are a special kind of knapsack polytopes. They have several interesting properties. E.g. they can be extended to a class of 0/1-polytopes with few facets and few edges for any pair of dimension d and number of Vertices N with $d < N \leq 2^d$.
The main result presented in this talk is, that compressed 0/1-polytopes have edge expansion at least 1. Thus there is a class of 0/1-polytopes with sparse graphs but edge expansion at least 1 (for every pair of dimension d and number of vertices N as above).
This result supports the conjecture of Mihail and Vazirani which says that all 0/1-polytopes have edge expansion at least 1.
This is joint work with Volker Kaibel.

70 — Sektion V — G02-111 — 14:15

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Vortragende

Freitag, 12.11.2004, Sektion I, G03-315

Chair:

Zeit		
13:30	**Harald Gropp** Thomas Clausen as combinatorialist	**1**
14:00	**Ingo Althöfer** A Secretary Problem, Shortest Paths in Graphs, and Cross Connections	**6**
14:30	**Stefan Schwarz** Optimal Lineups in Team Competitions	**11**
15:00	**Leif K. Jørgensen** Directed graphs related to Hadamard matrices	**16**

Freitag, 12.11.2004, Sektion I, G03-315

Chair:

Zeit		
16:00	**Mathias Schacht** On the Regularity Method for Hypergraphs	**21**
16:30	**Martin Sonntag** Competition hypergraphs and strongly connected digraphs	**26**
17:00	**Iris Reinbacher** Counting and uniform generation of wordlines	**31**
17:30	**Heidemarie Bräsel** H-Comparability graphs and irreducible sequences	**36**

Freitag, 12.11.2004, Sektion II, G03-214

Chair:

Zeit		
13:30	**Dieter Betten** Parallelisms of the unitals $2-(28,4,1)$	**2**
14:00	**Jürgen Bierbrauer** Netzwerke, Codes, Designs und projektive Ebenen	**7**
14:30	**Ralf Franken** The covering radius of long non-binary BCH codes	**12**
15:00	**Doreen Hertel** Cross-Correlation of binary Pseudorandom-Sequences	**17**

Freitag, 12.11.2004, Sektion II, G03-214

Chair:

Zeit		
16:00	**Jörn Quistorff** Slight improvements of the Singleton bound	**22**
16:30	**Olof Heden** On the symmetry group of perfect codes	**27**
17:00	**Patric Östergård** A New Bound for the Zero-Error Capacity Region of the Two-User Binary Adder Channel	**32**
17:30	**Ulrich Tamm** Single–Error Correcting Codes for Magnetic Recording	**37**

Freitag, 12.11.2004, Sektion III, G03-106

Chair:

Zeit	
13:30	**Anja Kohl** **3** Partial list colorings
14:00	**Arnfried Kemnitz** **8** $[r, s, t]$-Colorings and Hereditary Properties of Graphs
14:30	**Stephan Brandt** **13** Dense triangle-free graphs are four-colourable: A solution to the Erdős-Simonovits problem
15:00	**Stefan Krause** **18** Multicolor Euclidean Gameboard Ramsey Numbers

Freitag, 12.11.2004, Sektion III, G03-106

Chair:

Zeit		
16:00	**Florian Pfender** Hamiltonicity, pancyclicity and forbidden subgraphs	**23**
16:30	**Roman Čada** 2-connected claw-free graphs are prism-hamiltonian	**28**
17:00	**Jinfeng Feng** An efficient sufficient condition for a graph to be hamiltonian	**33**
17:30	**Guildo Helden** Each maximal planar graph with exactly two separating triangles is hamiltonian	**38**

Freitag, 12.11.2004, Sektion IV, G02-109

Chair:

Zeit		
13:30	**Frank H. Lutz** Random Realization of Surfaces	**4**
14:00	**Sascha Kurz** On the minimum diameter of plane integral point sets	**11**
14:30	**Hans Havlicek** My favorite 12-cap in PG(5,3)	**14**
15:00	**Ulrich Brehm** Grid polygons with point sources	**19**

Freitag, 12.11.2004, Sektion IV, G02-109

Chair:

Zeit		
16:00	**Jörg M. Wills** Equivelar Polyhedra	**24**
16:30	**Marcel Wild** The asymptotic number of binary n-codes and binary matroids	**29**
17:00	**Robert Nickel** The Flow Lattice of Oriented Matroids	**34**
17:30		**39**

Freitag, 12.11.2004, Sektion V, G02-111

Chair:

Zeit		
13:30	**Klaus Dohmen** Graph Sieves and Binomially Bounded Functions	**5**
14:00	**Mihyun Kang** Enumeration and uniform generation of planar structures	**10**
14:30	**Mike Loeffler** Recursive Counting and Generation of Labeled Cubic Planar Graphs	**15**
15:00	**Dan Kral** The circular chromatic index of graphs of high girth	**20**

Freitag, 12.11.2004, Sektion V, G02-111

Chair:

Zeit		
16:00		**25**
16:30	**Heiko Harborth** Turan Numbers for Vertices of Cube Graphs	**30**
17:00	**Jens-Peter Bode** Minimum regular rectilinear plane graph drawings	**35**
17:30		**40**

Samstag, 13.11.2004, Sektion I, G03-315

Chair:

Zeit		
10:15	**Vladimir Blinovsky** Maximal Set of Ideals Without Coprimes	**41**
10:45	**Peter Borg** Graphs with the Erdős-Ko-Rado Property	**46**
11:15	**Christian Bey** A dual Erdős-Ko-Rado theorem	**51**
11:45	**Egbert Harzheim** A construction of subsets of the reals that have a similarity decomposition	**56**

Samstag, 13.11.2004, Sektion I, G03-315

Chair:

Zeit		
13:45	**Uwe Leck** Maximal flat antichains of minimum weight	**61**
14:15	**Martin Kochol** Reduction of the 5-flow conjecture to cyclically 6-edge-connected snarks	**66**

Samstag, 13.11.2004, Sektion II, G03-214

Chair:

Zeit		
10:15	**Christian Richter** Spherical codes and Borsuk's conjecture	**42**
10:45	**Reinhard Laue** Resolvable designs from the Platonians	**47**
11:15	**Gohar Kyureghyan** The Only Crooked Power Functions are $x^{2^k+2^l}$	**52**
11:45	**Haik Mashurian** On a construction of T-shift synchronization codes	**57**

Samstag, 13.11.2004, Sektion II, G03-214

Chair:

Zeit		
13:45	**Annegret Wagler** On Normal Graphs and the Normal Graph Conjecture	**62**
14:15	**Ingo Schiermeyer** On Reed's conjecture about ω, Δ and χ	**67**

Samstag, 13.11.2004, Sektion III, G03-106

Chair:

Zeit		
10:15	**Christian Deppe** Searching with lies under error cost constraints	**43**
10:45	**Andrei Horbach** Two discrete relaxations of the k-TSP	**48**
11:15	**Bert Randerath** Using matching techniques for exact algorithms	**53**
11:45	**Stefan Hougardy** Sublinear Matching Algorithms	**58**

Samstag, 13.11.2004, Sektion III, G03-106

Chair:

Zeit		
13:45	**Thomas Kalinowski** The complexity of a problem in radiation therapy planning	**63**
14:15	**Andreas Schäfer** The “More for Less”-Paradox in Transportation Problems with Infinite-Dimensional Supply and Demand Vectors	**68**

Samstag, 13.11.2004, Sektion IV, G02-109

Chair:

Zeit		
10:15	**Bernd Fiedler** Computer algebraic determination of linear preservers of groups of permutation matrices	**44**
10:45	**Jesus de Loera** Real zeros of Erhart polynomials	**49**
11:15	**Julian Pfeifle** Coefficients and roots of Ehrhart polynomials	**54**
11:45	**Francisco Santos** Catalan-many associahedra	**59**

Samstag, 13.11.2004, Sektion IV, G02-109

Chair:

Zeit		
13:45	**Andreas Paffenholz** Polytopes from Products	**64**
14:15	**Rafael Mechtel** Compressed 0/1-polytopes have edge expansion at least 1	**69**

Samstag, 13.11.2004, Sektion V, G02-111

Chair:

Zeit		
10:15	**Simone Severini** A conjecture about a sufficient condition for hamiltonicity	**49**
10:45	**Wolfgang A. Schmid** A zero-sum problem and its connection to edge-disjoint cycles	**50**
11:15	**Walter Wenzel** Kotierte Graphen	**55**
11:45	**Hansjoachim Walther** Vertex Oblique Graphs	**60**

Samstag, 13.11.2004, Sektion V, G02-111

Chair:

Zeit	
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14:15	**70**