Liebe KombinatorikerInnen,

herzlich willkommen zum 22. Kolloquium über Kombinatorik, das 2002 erstmals in Magdeburg stattfindet! In den letzten 11 Jahren haben die Braunschweiger Organisatoren stets ein hervorragendes Kolloquium organisiert, dafür sei an dieser Stelle noch einmal herzlich gedankt.

Wir versuchen, die Tradition dieser von Walter Deuber initiierten Veranstaltung weiterleben zu lassen, an zwei Tagen eine Mischung unterschiedlicher Aspekte der Kombinatorik, oder, wie man heute eher sagen würde, der Diskreten Mathematik, zu präsentieren. Dazu gehören Kurzvorträge von jungen und auch nicht mehr ganz so jungen WissenschaftlerInnen. Umrahmt werden diese von einigen Hauptvorträgen, mit denen ein breites Spektrum der Diskreten Mathematik abgedeckt wird.

Für das wissenschaftliche Programm des Kolloquiums 2002 sind 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 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.
Gedankt sei natürlich auch allen Studierenden, MitarbeiterInnen und Sekretärinnen, die bei der Vorbereitung und Durchführung dieser Veranstaltung geholfen haben.

Stefan Felsner
Alexander Pott

Freitag, 15.11.2002

9:30	**Xavier Viennot (Talence Cedex)** "Combinatorics and Physics: The use of heaps of pieces"	(G03-308)
anschliessend	*Kaffeepause*	
10:45	**Petra Mutzel (Wien)** "Advances in Graph Drawing"	(G03-308)
11:45	**Gyula O.H. Katona (Budapest)** "A coding problem for pairs of sets"	(G03-308)
anschliessend	Verleihung der Hallmedaille des "Institute of Combinatorics and Applications" (ICA) durch Prof. Ralph Stanton Dazu sind auch Nichtmitglieder des ICA herzlich willkommen!	(G03-308)
anschliessend	*Mittagspause*	
14:00 - 16:00	**Sektionsvorträge**	
16:00 - 16:30	*Kaffeepause*	
16:30 - 18:30	**Sektionsvorträge**	
20:00	*Gemeinsames Abendessen* im Hotel Stadtfeld	

Samstag, 16.11.2002

9:00	**Heiko Harborth (Braunschweig)** "Several modified Ramsey numbers"	(G03-308)
anschliessend	*Kaffeepause*	
10:15 - 12:15	**Sektionsvorträge**	
12:15 - 14:00	*Mittagspause*	
14:00 - 15:30	**Sektionsvorträge**	
anschliessend	*Kaffeepause*	
15.45	**Graham Brightwell (London)** "The Number of 2-SAT Functions "	(G03-308)

Kurzvorträge Freitag, 15.11.2002

Zeit	Sektion I G03-106	Sektion II G02-109	Sektion III G02-111	Sektion IV G02-20	Sektion V G05-208
14:00	**P. Tittmann 1** Chromatic Polynomials and Vertex Separators	**I. Althöfer 2** Inventing game variants with computer help	**M. Braun 3** q-Analoga kombinatorischer t-Designs	**J. Chlebikova 4** Precoloring extension problem on partial k-trees	**M. Kriesell 5** Mader's Conjecture on Extremely Critically Connected Graphs
14:30	**A. Reifegerste 6** On diagrams and forbidden patterns of permutations	**Chr. Deppe 7** A new upper bound for the Renyi-Ulam Game with fixed number of lies	**S. Giese 8** Divisible Designs and finite Laguerre Geometries	**I. Schiermeyer 9** Rainbow Colourings	**D. Kühn 10** Minors in locally sparse graphs
15:00	**T. Theobald 11** A new identity on Catalan numbers in real geometry	**B. Reichel 12** On the descriptional complexity of some variants of Lindenmayer systems	**P. Östergård 13** There Exist Nonisomorphic STS(19) with Equivalent Point Codes	**A. Kemnitz 14** $[r, s, t]$-Colorings of Graphs	**M. Marangio 15** Totalchromatische Zahl von Produktgraphen
15:30	**J. Katriel 16** Asymptotic properties of the spectra of conjugacy class-sums in the symmetric group	**A. Wagler 17** How Imperfect are Webs and Antiwebs?	**H. Gropp 18** Colouring configurations	**M. Voigt 19** Characterization of graphs dominated by a path	**T. Prellberg 20** A proof of the Monotonicity Conjecture by Friedman, Joichi, and Stanton.
16:00	*Kaffeepause*				
16:30	**O. Heden 21** On the classification of binary perfect 1-error correcting codes	**M. Henk 22** Free planes in lattice sphere packings	**D. Osthus 23** Topological cliques in graphs of large girth	**M. Kyureghyan 24** Complexity of monotonicity checking	**A. Horbach 25** On the facet description of the k-cycle polytope
17:00	**J. Degraer 26** Exhaustive generation of association schemes	**F. Fodor 27** Overlapping congruent convex bodies	**M. Erné 28** Spoons, forks and upper antichains	**A. Coja-Oghlan 29** Finding Large Independent Sets in Polynomial Expected Time	**F. Lutz 30** Series of Nearly Neighborly Centrally Symmetric 3-Spheres with Cyclic Group Action
17:30	**H. Lefmann 31** Sparse Parity-Check Matrices over Finite Fields	**A. Wassmer 32** Bounds of the Topological Method	**T. Gerlach 33** On cycles through specified vertices	**K. Jansen 34** Scheduling Malleable Parallel Tasks: An Asymptotic Fully Polynomial-Time Approximation Scheme	**Y. Nikuklin 35** Stability and accuracy functions for vector perturbed combinatorial optimization problems
18:00	**J. Quistorff 36** A new nonexistence result for sharply multiple transitive permutation sets	**A. Schuermann 37** Kepler's false assertion on sphere packings	**T. Böhme 38**	**D. van Dyck 39** Heuristic approaches to the reduction of Yutsis graphs	**U. Brehm 40**

Kurzvorträge Samstag, 16.11.2002

Zeit	Sektion I G03-106	Sektion II G02-109	Sektion III G02-111	Sektion IV G02-20	Sektion V G03-308
10:15	**H.-J. Voss** **41** On k-trestles in chordal 3-connected planar graphs	**E. Manthei** **42** On a known but nevertheless new formula of a very old problem	**M. Sonntag** **43** Difference labelling of the generalized source-join of digraphs	**J.-P. Bode** **44** Triangle and hexagon gameboard Ramsey numbers	**G. Laßmann** **45** Die Evolution als Vorbild zur Lösung komplexer Optimierungsprobleme
10:45	**M. Margraf** **46** On the Linear Intersection Number of Graphs	**U. Leck** **47** A property of Macaulay posets and its applications	**H.-M. Teichert** **48** Large Competition hypergraphs	**M. Harborth** **49** King Graph Ramsey Numbers	**G. Brinkmann** **50** Teaching with Graffiti
11:15	**A. Poenitz** **51** The Chromatic Number, Steiner Trees and the Travelling Salesman. Is one algorithm enough for everything?	**I. Roberts** **52** Some new problems on Sperner Families	**S. Hougardy** **53** Perfectness is an Elusive Graph Property	**F. Vallentin** **54** Lattice Coverings	**B. Schmidt** **55** Goblin: A Software Package for Graph Algorithms
11:45	**O. Pikhurko** **56** Prime Labelling of Trees	**H. Aydinian** **57**	**A. Kohl** **58** On $L(d,1)-$ labellings of graphs	**J. Pfeifle** **59**	**D. Gernert** **60** A knowledge-based system for the support of graphtheoretical proofs
12:15	*Mittagspause*				
14:00	**M. Grüttmüller** **61** On the Existence of a PBD$(30,\{4,5,7,8^*\})$	**C. Lange** **62**	**S. Brandt** **63**	**U. Tamm** **64** Lattice paths not touching a given boundary	**H. Zhang** **65** Approximation Algorithms for General Packing Problems and Application in Multicast Congestion Problem
14:30	**H. Haanpää** **66** The near resolvable 2-(13,4,3) designs and 13-player whist tournaments	**D. Drake** **67** A Linear Time Approximation Algorithm for the Weighted Matching Problem	**K. Dohmen** **68** Bonferroni-Ungleichungen durch chordale Graphen	**D. Cieslik** **69**	**T. Nierhoff** **70** Average Case Analysis of a Hard Dial-a-Ride Problem
15:00	**H. Pralle** **71** Hyperplanes of dual polar spaces	**72**	**73**	**74**	**K. Engel** **75** Optimal Multileaf Collimator Field Segmentation for Inverse Radiotherapy Planning

Räume

Hauptvorträge	:	G03-308
Sektionsvorträge	:	Am **Freitag** finden die Sektionsvorträge in den Räumen G03-306, G02-109, G02-111, G02-20 (im selben Gebäudekomplex 02/03 wie die Hauptvorträge) sowie im Raum G05-208 statt (etwa 100 Meter vom Gebäude 02/03 entfernt). Der Raum G03-308 kann am Freitag nachmittag nicht genutzt werden (bitte Taschen mitnehmen!). Am **Samstag** finden alle Vorträge im Gebäudekomplex 02/03 statt (Räume G03-106, G03-308, G02-20, G02-111, G02-109).
Tagungsbüro	:	G03-235
Bibliothek	:	G02-???
Kaffee/Tee/Erfrischungen	:	G03-214 und G03-235
Internet	:	G03-118

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 G03-118 möglich. Die Bibliothek ist am Freitag von 9 bis 17 Uhr geöffnet. Wer die Bibilothek auch am Samstag nutzen möchte, wende sich bitte ans Tagungsbüro.

Hauptvorträge

Graham Brightwell (London) : The Number of 2-SAT Functions
Heiko Harborth (Braunschweig): Several modified Ramsey numbers
Gyula O.H. Katona (Budapest) : A coding problem for pairs of sets
Petra Mutzel (Wien) : Advances in Graph Drawing
Xavier Viennot (Talence Cedex): Combinatorics and Physics: The use of heaps of pieces

Kurzvorträge

Ingo Althöfer (Jena) : Inventing game variants with computer help
Harout Aydinian (Bielefeld) :
Jens-P. Bode (Braunschweig) : Triangle and hexagon gameboard Ramsey numbers
Thomas Böhme (Ilmenau) :
Michael Braun (Bayreuth) : q-Analoga kombinatorischer t-Designs
Stephan Brandt (Ilmenau) :
Ulrich Brehm (Dresden) :
Gunnar Brinkmann (Bielefeld) : Teaching with Graffiti
Janka Chlebikova (Kiel) : Precoloring extension problem on partial k-trees
Dietmar Cieslik (Greifswald) :
Amin Coja-Oghlan (Berlin) : Finding Large Independent Sets in Polynomial Expected Time
Jan Degraer (Ghent) : Exhaustive generation of association schemes
Christian Deppe (Bielefeld) : A new upper bound for the Renyi-Ulam Game with fixed number of lies
Klaus Dohmen (Mittweida) : Bonferroni-Ungleichungen durch chordale Graphen
Doratha Drake (Berlin) : A Linear Time Approximation Algorithm for the Weighted Matching Problem
Konrad Engel (Rostock) : Optimal Multileaf Collimator Field Segmentation for Inverse Radiotherapy Planning
Marcel Erné (Hannover) : Spoons, forks and upper antichains
Ferenc Fodor (Szeged, Hungary): Overlapping congruent convex bodies
Tobias Gerlach (Ilmenau) : On cycles through specified vertices
Dieter Gernert (München) : A knowledge-based system for the support of graphtheoretical proofs
Sabine Giese (Berlin) : Divisible Designs and finite Laguerre Geometries
Harald Gropp (Heidelberg) : Colouring configurations
Martin Grüttmüller (Rostock) : On the Existence of a PBD$(30, \{4, 5, 7, 8^*\})$
Harri Haanpää (Helsinki) : The near resolvable 2-(13,4,3) designs and 13-player whist tournaments
Martin Harborth (Braunschweig): King Graph Ramsey Numbers

Olof Heden (Stockholm)	: On the classification of binary perfect 1-error correcting codes
Martin Henk (Berlin)	: Free planes in lattice sphere packings
Andrei Horbach (Magdeburg)	: On the facet description of the k-cycle polytope
Stefan Hougardy (Berlin)	: Perfectness is an Elusive Graph Property
Klaus Jansen (Kiel)	: Scheduling Malleable Parallel Tasks: An Asymptotic Fully Polynomial-Time Approximation Scheme
Jacob Katriel (Haifa)	: Asymptotic properties of the spectra of conjugacy class-sums in the symmetric group
Arnfried Kemnitz (Braunschweig)	: $[r, s, t]$-Colorings of Graphs
Anja Kohl (Freiberg)	: On $L(d, 1)-$ labellings of graphs
Matthias Kriesell (Hannover)	: Mader's Conjecture on Extremely Critically Connected Graphs
Daniela Kühn (Hamburg)	: Minors in locally sparse graphs
Marina Kyureghyan (Bielefeld)	: Complexity of monotonicity checking
Carsten Lange (Berlin)	:
Gunter Laßmann (Berlin)	: Die Evolution als Vorbild zur Lösung komplexer Optimierungsprobleme
Uwe Leck (Rostock)	: A property of Macaulay posets and its applications
Hanno Lefmann (Chemnitz)	: Sparse Parity-Check Matrices over Finite Fields
Frank Lutz (Berlin)	: Series of Nearly Neighborly Centrally Symmetric 3-Spheres with Cyclic Group Action
Eckhard Manthei (Mittweida)	: On a known but nevertheless new formula of a very old problem
Massimiliano Marangio (Salzgitter)	: Totalchromatische Zahl von Produktgraphen
Marian Margraf (Kiel)	: On the Linear Intersection Number of Graphs
Till Nierhoff (Berlin)	: Average Case Analysis of a Hard Dial-a-Ride Problem
Yura Nikulin (Magdeburg)	: Stability and accuracy functions for vector perturbed combinatorial optimization problems
Patric Östergård (Helsinki)	: There Exist Nonisomorphic STS(19) with Equivalent Point Codes
Deryk Osthus (Berlin)	: Topological cliques in graphs of large girth
Julian Pfeifle (Berlin)	:
Oleg Pikhurko (Cambridge, England)	: Prime Labelling of Trees
André Poenitz (Mittweida)	: The Chromatic Number, Steiner Trees and the Travelling Salesman. Is one algorithm enough for everything?
Harm Pralle (Braunschweig)	: Hyperplanes of dual polar spaces
Thomas Prellberg (Clausthal-Zellerfeld)	: A proof of the Monotonicity Conjecture by Friedman, Joichi, and Stanton.
Jörn Quistorff (Hamburg)	: A new nonexistence result for sharply multiple transitive permutation sets

Bernd Reichel ()	: On the descriptional complexity of some variants of Lindenmayer systems
Astrid Reifegerste (Hannover)	: On diagrams and forbidden patterns of permutations
Ian Roberts (Casuarina, Australien)	: Some new problems on Sperner Families
Ingo Schiermeyer (Freiberg)	: Rainbow Colourings
Bernhard Schmidt (Augsburg)	: Goblin: A Software Package for Graph Algorithms
Achill Schuermann (München)	: Kepler's false assertion on sphere packings
Martin Sonntag (Freiberg)	: Difference labelling of the generalized source-join of digraphs
Ulrich Tamm (Chemnitz)	: Lattice paths not touching a given boundary
Hanns-Martin Teichert (Lübeck)	: Large Competition hypergraphs
Thorsten Theobald (Muenchen)	: A new identity on Catalan numbers in real geometry
Peter Tittmann (Mittweida)	: Chromatic Polynomials and Vertex Separators
Frank Vallentin (München)	: Lattice Coverings
Dries Van Dyck (Ghent)	: Heuristic approaches to the reduction of Yutsis graphs
Margit Voigt (Ilmenau)	: Characterization of graphs dominated by a path
Heinz-Jürgen Voss (Dresden)	: On k-trestles in chordal 3-connected planar graphs
Annegret Wagler (Berlin)	: How Imperfect are Webs and Antiwebs?
Arnold Wassmer (Berlin)	: Bounds of the Topological Method
Hu Zhang (Kiel)	: Approximation Algorithms for General Packing Problems and Application in Multicast Congestion Problem

Weitere Teilnehmer

Christine Bessenrodt (Hannover), Christian Bey (Magdeburg), Heidemarie Bräsel (Magdeburg), Jürgen Dassow (Magdeburg), Florian Diedrich (Kiel), Veerle Fack (Ghent), Sandor Fekete (Braunschweig), Stefan Felsner (Berlin), Olga Gerber (Kiel), Hans-Dietrich Gronau (Rostock), Andrea Hackmann (Braunschweig), Jochen Harant (Ilmenau), Egbert Harzheim (Köln), Laura Heinrich-Litan (Berlin), Franz Hering (Dortmund), Christoph Josten (Frankfurt), Heinz A.Jung (Berlin), Thomas Kalinowski (Rostock), Gohar Kyureghyan (Magdeburg), Mark de Longueville (Berlin), Haik Mashurian (Bielefeld), Walter Oberschelp (Aachen), Alexander Pott (Magdeburg), Lars Ritter (Hannover), Ralph Stanton (Canada), Michael Stiebitz (Denton, TX, USA), Ralf Thoele (Kiel), Carsten Thomassen (Lyngby), Christian Thürmann (Braunschweig), Bernulf Weißbach (Magdeburg),

Freitag, 15.11.2001 — Zeit: 9:30 — G03-308

Combinatorics and Physics: The use of heaps of pieces

XAVIER VIENNOT (Talence Cedex)

The relation between combinatorics and theoretical physics has been particularily active and fruitful in the last few years. It is classical to relate statistical physics and algebraic graph theory.
I will present more recent and less classical interactions, mostly based on the use of the notion of "heaps of pieces", giving a "geometric" and combinatorial interpretation of the algebraic notion of commutations classes of words of the so called Cartier-Foata monoids (called trace monoids in theoretical computer science).
The combinatorial tour in this domain will include topics like directed animals, Baxter's hard hexagons model, Solid-on-Solid model, and the so-called 2D Lorentzian triangulations in quantum gravity.

Freitag, 15.11.2001 — Zeit: 10:45 — G03-308

Advances in Graph Drawing

PETRA MUTZEL (Wien)

We will focus on recent progress made in automatic graph layout. This field is getting increasing attention (keywords are, e.g., process diagrams, UML, CASE-tools, Re-Engineering, Bioinformatics). After a general introduction we will focus on the three problems cross counting, crossing minimization (1-edge insert), and bend minimization in orthogonal graph drawing. The latter two problems deal with optimization over the set of all combinatorial embeddings of a planar graph. In generally, such optimization problems are NP-hard. We will see how the so-called data structure of SPQR-trees is useful for attacking these problems in theory and practice.
Now you may wonder about the recent results in counting crossings. Come and see...

Freitag, 15.11.2001 — Zeit: 11:45 — G03-308

A coding problem for pairs of sets

GYULA O.H. KATONA (Budapest)

Let X be an n–element finite set, $0 < k < n/2$ an integer. Suppose that (A_1, B_1) and (A_2, B_2) are pairs of disjoint k-element subsets of X (that is, $|A_1| = |B_1| = |A_2| = |B_2| = k, A_1 \cap B_1 = \emptyset, A_2 \cap B_2 = \emptyset$). Define the distance of these pairs by $d((A_1, B_1), (A_2, B_2)) = \min\{|A_1 - A_2| + |B_1 - B_2|, |A_1 - B_2| + |B_1 - A_2|\}$. One can see that this is really a distance on the space of such pairs. $C(n, k, d)$ denotes the maximum number of pairs (A, B) with pairwise difference at least d. The motivation comes from database theory. The lower and upper estimates use Hamiltonian type theorems, traditional code constructions and Rödl's method for packing. In the case when $n = 2k$ a method initiated by Professor R.C. Bose and his coathors is used.

Sonnabend, 16.11.2001 — Zeit: 9:00 — G03-308

Several modified Ramsey numbers

HEIKO HARBORTH (Braunschweig)

The classical Ramsey number $r = r(K_a)$ is the smallest number r such that every 2-coloring of the edges of the complete graph K_r contains a monochromatic K_a. Only $r(K_3) = 6$ and $r(K_4) = 18$ are known as exact values, and $43 \leq r(K_5) \leq 49$. Known exact values and challenging open problems will be presented for some variations and generalizations: Pairs of subgraphs (generalized Ramsey numbers), more colors, sets of subgraphs, convex Ramsey numbers, circular Ramsey numbers, weak Ramsey numbers, zero-sum Ramsey numbers, drawing Ramsey numbers, and Ramsey numbers for other host graphs as complete bipartite graphs, cube graphs, octahedron graphs, and different game-board graphs.

Sonnabend, 16.11.2001 — Zeit: 15:45 — G03-308

The Number of 2-SAT Functions

GRAHAM BRIGHTWELL (London)

Freitag, 15.11.2001 — Zeit: 14.00

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1 — Sektion I — G03-106 — 14:00

Chromatic Polynomials and Vertex Separators

PETER TITTMANN (Mittweida)

The computation of the chromatic polynomial $P(G,x)$ of a graph $G=(V,E)$ is a *#P*-hard problem. However, the computation of $P(G,x)$ becomes easy if G is a graph of bounded treewidth. We show that it remains easy if the complement $\bar{G}$ of G is a graph of bounded treewidth. Moreover, there is a class of graphs permitting an easy computation of $P(G,x)$ that can be defined by vertex separators of bounded size in G or in $\bar{G}$ which generalizes simultaneously the two first introduced graph classes. In order to perform the computation of the chromatic polynomial in this class, we define a new so-called *cluster polynomial* $C(G,x)$ that is a generating function for the number of partitions of V of which the blocks form cliques in G. The cluster polynomial plays a similar role in $\bar{G}$ as the chromatic polynomial in G. It will be shown that splitting formulae for $C(G,x)$ and $P(G,x)$ are the key to polynomial algorithms in the new graph class.

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2 — Sektion II — G02-109 — 14:00

Inventing game variants with computer help

INGO ALTHÖFER (Jena)

Computers and intelligent programs for playing whole classes of games may help to speed up the process of inventing new game variants (observe: we mean game variants but not completely new games). The commercial program “Zillions of Games” and the new 2-player game “Clobber” (invented in 2001 by Nowakowski, Albert, and Grossman) are used to demonstrate how automatic invention and evaluation of game variants may be done.

In “Zillions of Games” the user only has to specify the rules of a game in a Lisp-like manner. Then the Zillions engine automatically generates a program which plays this game intelligently. Game variants may be invented by modifying/mutating the rules file of an existing game. A whole product space of game variants results from combinations of such micro mutations. Criteria for the automatic measurement of the interestingness of a game (under the Zillions environment) are proposed and discussed.

References

[Las] Em. Lasker. Brettspiele der Vlker. Verlag August Scherl, Berlin, 1931.

[LM] M. Lefler and J. Mallett, webpage ¡www.zillions-of-games.com¿. Updated weekly since 1998.

[Wer] T. Werneck. Leitfaden fr Spieleerfinder. Ravensburger Spieleverlag, Ravensburg, fifth edition, 2002.

3 — Sektion III — G02-111 — 14:00

q-Analoga kombinatorischer t-Designs

MICHAEL BRAUN (Bayreuth)

Ein $t-(n,k,\lambda;q)$-Design, oder auch $t-(n,k,\lambda)$-Design über $GF(q)$ genannt, ist eine System $\mathcal{B}$ von k-Unterräumen des Vektorraums $GF(q)^n$, genannt *Blöcke*, falls jeder t-Unterraum von $GF(q)^n$ in genau λ Blöcken enthalten ist. Diese Verallgemeinerung des Design-Begriffs auf Vektorräume wurde 1987 von Simon Thomas eingeführt, der eine Familie von $2-(n,3,7;2)$-Designs mit $n \equiv \pm 1 mod 6$ konstruierte. Wir stellen eine Methode vor, die es uns ermöglicht, systematisch $t-(n,k,\lambda;q)$-Designs zu konstruieren: das Vorschreiben einer Gruppe von Automorphismen. Dabei ist die vorgeschriebene Gruppe G eine Untergruppe der allgemeinen linearen Gruppe $GL(n,q)$. Die Menge der Blöcke eines $t-(n,k,\lambda;q)$-Designs kann damit als eine Vereinigung von einigen G-Bahnen auf der Menge der k-Unterräume geschrieben werden. Zur Darstellung des $t-(n,k,\lambda;q)$-Designs benötigen wir daher nur jeweils einen Repräsentanten aus jeder Bahn. Wir erhalten daher eine erhebliche Reduktion der Komplexität. Mit dieser Methode konnte das weltweit erste 3-Design über $GF(q)$ konstruiert werden, ein $3-(8,4,11;2)$-Design.

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4 — Sektion IV — G02-20 — 14:00

Precoloring extension problem on partial k-trees

JANKA CHLEBIKOVA (Kiel)

Precoloring extension problem is the following: Given a graph G with some precolored vertices from the set S of available colors.
Can the given precoloring be extended to a proper coloring of all vertices of G using only the colors from the set S? We considered d-PrExt problem, where every color from S is used for at most d precolored vertices. It is known that the d-PrExt problem is NP-complete even in rather restricted cases, e.g. 1-PrExt problem on bipartite graphs precolored with 3 colors.
In this talk we present a linear time algorithm on partial k-trees for the decision and the search version of d-PrExt problem. We present also some structural results that are relevant to mentioned problem. There exists a constant C (depending on k and d only and not on the size of the set S) such that if the answer to an input of the d-PrExt problem for the partial k-trees is affirmative, then there exists an extension using at most C colors.

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5 — Sektion V — G05-208 — 14:00

Mader's Conjecture on Extremely Critically Connected Graphs

MATTHIAS KRIESELL (Hannover)

Freitag, 15.11.2001 — Zeit: 14:30

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6 — Sektion I — G03-106 — 14:30

On diagrams and forbidden patterns of permutations

ASTRID REIFEGERSTE (Hannover)

In recent time much work has been done counting permutations with restrictions on the patterns they contain.
In the talk, we will demonstrate how the diagram of a permutation can be utilized to study pattern avoidance. In particular, the diagram approach yields simple bijective proofs for some enumerative results concerning forbidden patterns of several permutation classes.

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7 — Sektion II — G02-109 — 14:30

A new upper bound for the Renyi-Ulam Game with fixed number of lies

CHRISTIAN DEPPE (Bielefeld)

We consider the Renyi-Ulam Game, which can be described in the following way. Someone, let us call her Carole, thinks of a number between one and M. Another person, let us call him Paul, is allowed to ask questions to which Carole is supposed to answer only yes or no. Thus Paul asks for subsets of the set $\{1, \ldots, M\}$. The difficulty is that Carole is allowed to lie l-times. We want to know: How many questions does Paul have to ask to get the correct number? We derive an upper bound for the number of questions needed if the maximal number of lies is fixed. The difference of the upper bound and the well known lower bound is one, if M is big enough. We give two proofs for this result. The first method is to look at doubled and $\frac{3}{2}$ times number of the message and show that at least two questions more are needed. The second proof gives a strategy by local optimization.

8 — Sektion III — G02-111 — 14:30

Divisible Designs and finite Laguerre Geometries

SABINE GIESE (Berlin)

Divisible designs are a special kind of incidence structures from which we can get constant weight codes. We use a construction principle introduced by A.G. Spera in the early nineties and construct series of divisible designs from a finite Laguerre geometry. The geometry we use is a chain geometry whose point set consists of the elements of the projective line over the (local) ring of dual numbers over a finite field GF(q).
We show a close connection between these divisible designs and divisible designs whose construction started from a conic in a plane of a 3-dimensional projective space.

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9 — Sektion IV — G02-20 — 14:30

Rainbow Colourings

INGO SCHIERMEYER (Freiberg)

For given graphs G, H the rainbow number $rb(G, H)$ is the smallest number m of colours such that if we colour the edges of G with at least m different colours, then there is always a totally multicoloured or rainbow copy of H. We will list the known rainbow numbers if G is the complete graph and report about recent progress on the conjecture of Erdős, Simonovits and Sós on the rainbow numbers $rb(K_n, C_k)$ for cycles. For $H = kK_2$ the values $ext(n, kK_2)$ (the maximum number of edges in a graph containing no matching with k edges) have been determined by Erdős and Gallai.

Theorem 1
Let G be a graph of order n and with m edges. If $m > max\{\binom{2k-1}{2}, \binom{k-1}{2} + (k-1)(n-k+1)\} = ext(n, kK_2)$, then $kK_2 \subset G$.

For rainbow matchings we will show the following analogue.

Theorem 2
$rb(n, kK_2) \geq ext(n, (k-1)K_2) + 2$ for all $k \geq 2$ with equality if $2 \leq k \leq 3$ or $k \geq 4$ and $n \geq 3k+3$.

Finally, new results on the rainbow numbers $rb(Q_n, Q_2)$ for the hypercube Q_n will be presented.

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10 — Sektion V — G05-208 — 14:30

Minors in locally sparse graphs

DANIELA KÜHN (Hamburg)

Bollobás and Thomason as well as Komlós and Szemerédi independently proved that there exists a constant c such that every graph G of minimum degree $\geq cr^2$ contains a subdivision of the complete graph K_r on r vertices. This is best possible up to the value of the constant c. However, Mader showed that if the girth of G is large, then a minimum degree of $r-1$ will do. While his bound on the girth is linear in r, Deryk Osthus and I proved that a girth of 200 already suffices. This implies that the conjecture of Hajós that every graph of chromatic number $\geq r$ contains a subdivision of K_r (which is false in general) is true for graphs of girth ≥ 200. Moreover, we showed that every graph G of girth ≥ 5 still contains a subdivision of a complete graph whose order is almost linear in the minimum degree of G. We also obtained related results for ordinary minors. For example, Hadwiger's conjecture is true for $K_{s,s}$-free graphs whose chromatic number is sufficiently large compared with s.

Freitag, 15.11.2001 — Zeit: 15:00

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11 — Sektion I — G03-106 — 15:00

A new identity on Catalan numbers in real geometry

THORSTEN THEOBALD (Muenchen)

A famous occurrence of Catalan numbers in geometry is that they answer the following question:

How many lines in complex projective n-space $\mathbb{P}^n$ are meeting
$2n-2$ given general $(n-2)$-planes $\Lambda_1, \ldots, \Lambda_{2n-2}$? (Namely, C_{n-1}.)

Questions of this type are at the heart of Schubert calculus. In particular, the case $n = 2$ says that four general lines in $\mathbb{P}^3$ have two common transversals.

Not until recently, reality of these constructions have been shown; i.e., there exist real linear subspaces in $\mathbb{P}^n$ for which all the (a priori complex) solutions are *real*.

By combining recent results in the real Schubert calculus with classical perturbation arguments, we extend these combinatorial results from linear subspaces to quadrics, replacing the notion of transversality by tangency. Namely, we show the following statement: For each $n \geq 2$ there are $2^{n-2}C_{n-1}$ lines in $\mathbb{P}^n$ tangent to $2n-2$ general quadratic hypersurfaces in $\mathbb{P}^n$, and there exists a configuration of $2n-2$ real quadrics so that all the mutually tangent lines are real.

(Based on joint work with F. Sottile)

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12 — Sektion II — G02-109 — 15:00

On the descriptional complexity of some variants of Lindenmayer systems

BERND REICHEL ()

Lindenmayer systems are a formal language theoretical model for the development of organisms.
We define the number of productions and the number of symbols as complexity measures for Lindenmayer systems with a completely parallel derivation process and for some variants of limited Lindenmayer systems with a partially parallel derivation process and for the associated languages. We prove that up to an initial part any natural number can occur as complexity of some language. Moreover, we show the existence of languages with small descriptional complexity with respect to one mechanism and large complexity with respect to the other device.

This is joint work with Jürgen Dassow.

13 — Sektion III — G02-111 — 15:00

There Exist Nonisomorphic STS(19) with Equivalent Point Codes

PATRIC ÖSTERGÅRD (Helsinki)

The rows of a point by block incidence matrix of a design can be used to generate a code, the point code of the design. It is known that binary point codes of nonisomorphic Steiner triple systems of order v, STS(v), are inequivalent when $v \leq 15$, but whether this also holds for higher orders has been open. An example (out of several found) of two nonisomorphic STS(19) with equivalent point codes is presented.

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14 — Sektion IV — G02-20 — 15:00

$[r, s, t]$-Colorings of Graphs

ARNFRIED KEMNITZ (Braunschweig)

Given non-negative integers r, s, and t, an $[r, s, t]$-coloring of a graph G with vertex set $V(G)$ and edge set $E(G)$ is a mapping c from $V(G) \cup E(G)$ to the color set $\{0, 1, \ldots, k-1\}$ 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.
This is an obvious generalization of all classical graph colorings since c is a vertex coloring if $r = 1$, $s = t = 0$, an edge coloring if $s = 1$, $r = t = 0$, and a total coloring if $r = s = t = 1$, respectively.
We present first results on $\chi_{r,s,t}(G)$ such as some bounds and also exact values for specific classes of graphs.

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15 — Sektion V — G05-208 — 15:00

Totalchromatische Zahl von Produktgraphen

MASSIMILIANO MARANGIO (Salzgitter)

Der *Produktgraph* oder *kartesische Produkt* $G \times H$ zweier Graphen G und H ist der Graph mit Knotenmenge $V(G) \times V(H)$, in dem der Knoten (u, v) genau dann zu (x, y) benachbart ist, wenn $u = x$ und $vy \in E(H)$ oder $v = y$ und $ux \in E(G)$.

Die *totalchromatische Zahl* $\chi''(G)$ eines Graphen G ist die kleinste Anzahl Farben, die nötig ist, um die Elemente (Knoten und Kanten) des Graphen so zu färben, daß adjazente oder inzidente Elemente verschieden gefärbt sind.

In diesem Vortrag wird die totalchromatische Zahl des kartesischen Produkt zweier Graphen untersucht und einige Schranken sowie exakte Ergebnisse für spezielle Graphenklassen vorgestellt.

Freitag, 15.11.2001 — Zeit: 15:30

16 — Sektion I — G03-106 — 15:30

Asymptotic properties of the spectra of conjugacy class-sums in the symmetric group

JACOB KATRIEL (Haifa)

Some asymptotic properties of the set of values obtained by the central characters that correspond to single-cycle conjugacy classes of the symmetric group S_n have been explored. Conjectures, supported by computed data for n up to 64, concerning the asymptotic behavior of the number of distinct central characters corresponding to the class of transpositions and that of three-cycles, are presented. Refinements involving partitioning the set of irreducible representations according to their Durfee box sizes are also examined. The conjectures presented suggest interesting asymptotic features of the representation theory of the symmetric group, yet to be uncovered.

17 — Sektion II — G02-109 — 15:30

How Imperfect are Webs and Antiwebs?

ANNEGRET WAGLER (Berlin)

In order to decide how imperfect a graph is we stepwise relax perfectness by a nested collection of superclasses of perfect graphs: near-perfect, rank-perfect, and weakly rank-perfect graphs. For that, we start with the description of the stable set polytope for perfect graphs and allow stepwise more general facets for the graphs in each superclass. Membership in those superclasses indicates how far a graph is away from being perfect. We discuss to which of the three classes webs and antiwebs belong - that are graphs with circular symmetry that generalize odd holes and odd antiholes. We characterize which webs and antiwebs are near-perfect and show that antiwebs are rank-perfect. In a joint work with Arnaud Pêcher, we further found a construction for non-rank facets in stable set polytopes of webs providing infinitely many new examples of webs which are not rank- but weakly rank-perfect.

18 — Sektion III — G02-111 — 15:30

Colouring configurations

HARALD GROPP (Heidelberg)

A configuration is a linear regular uniform hypergraph. Since configurations are much older than hypergraphs (they are even older than graphs), usually a geometric language of points and lines is used.
The points are coloured by assigning a number (the colour) from 1 to n to each point. A colouring is allowed if certain conditions are fulfilled. The usual condition is that every line (or hyperedge) contains two points with different colours. This leads to the definition of the chromatic number. In particular, the existence problem of blocking sets of configurations is related to the usual colouring.
The colouring of mixed hypergraphs (introduced by Voloshin) leads to the definition of the upper chromatic number. Here also anti-edges or C-edges are coloured such that every such C-edge contains two vertices with the same colour.

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19 — Sektion IV — G02-20 — 15:30

Characterization of graphs dominated by a path

MARGIT VOIGT (Ilmenau)

We say that a graph G is $\mathcal{D}_k$*-dominated* if every connected induced subgraph of G has an induced dominating path P_s of length s and $s \leq k$. Our aim is the characterization of these graphs by forbidden induced subgraphs.
A *leaf graph* of a graph G is obtained by adding pendant edges on every non-cut vertex. Denote the leaf graph of the cycle C_k by L_k and the leaf graph of the claw $K_{1,3}$ by B. Furthermore define $\mathcal{F}_k := \{L_3, \ldots, L_{k+1}, B, P_{k+3}, C_{k+3}\}$.
We obtain the following result:
A graph G does not contain an induced subgraph $H \in \mathcal{F}_k$ if and only if G is $\mathcal{D}_k$-dominated.

This is joint work with G. Bacsó and Zs. Tuza, Computer and Automation Institute, Hungarian Academie of Sciences, Kende u: 13-17, H-1111 Budapest, Hungary.

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20 — Sektion V — G05-208 — 15:30

A proof of the Monotonicity Conjecture by Friedman, Joichi, and Stanton.

THOMAS PRELLBERG (Clausthal-Zellerfeld)

Consider the collection of all integer partitions whose part sizes lie in a given set. Such a set is called monotone if the generating function has weakly increasing coefficients.
Assuming the Friedman-Joichi-Stanton Conjecture, the monotone subsets can be classified.
In this talk we will present a proof of this long-standing Conjecture.

Freitag, 15.11.2001 — Zeit: 16:30

21 — Sektion I — G03-106 — 16:30

On the classification of binary perfect 1-error correcting codes

OLOF HEDEN (Stockholm)

The number of different perfect codes of length $n = 2^k - 1$ is greater than $2^{2^{n-\log(n+1)}}$ and the number of different constructions of perfect codes, presented in the literature, is now more then 20. Let the rank of a perfect 1-error correcting code C in Z_2^n, $rank(C)$, be the dimension of the subspace spanned by the words of C. It is shown that if $n-\log(n+1) \leq rank(C) \leq n-1$ then C can be constructed by using a construction given recently by D.S. Krotov.

References:

O. Heden, On the classification of perfect binary 1-error correcting codes, submitted.

D.S. Krotov, Combining construction of perfect binary codes, Problems of Information Transmission 36(2000)349-353.

22 — Sektion II — G02-109 — 16:30

Free planes in lattice sphere packings

MARTIN HENK (Berlin)

We show that the complement of an arbitrary lattice packing of n-dimensional spheres contains an $n/\log(n)$-dimensional affine plane, if n is large. Such a plane is called a free plane and the given bound improves on former bounds.

23 — Sektion III — G02-111 — 16:30

Topological cliques in graphs of large girth

DERYK OSTHUS (Berlin)

In my talk, I will discuss the following result on topological minors in locally sparse graphs, obtained together with Daniela Kühn:
Every graph of minimum degree at least r and girth at least 186 contains a subdivision of K_{r+1} and for large r a girth of at least 15 suffices.
This improves a result of Mader, who gave a bound on the girth required which is linear in r. It also implies that the conjecture of Hajós that every graph of chromatic number at least r contains a subdivision of K_r (which is false in general) is true for graphs of girth at least 186 (or 15 if r is large). We also obtain results of a similar nature for ordinary minors.

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24 — Sektion IV — G02-20 — 16:30

Complexity of monotonicity checking

MARINA KYUREGHYAN (Bielefeld)

Given a poset P and an unknown real-valued function f on it, verify whether this function is monotone, that is, whether

$$f(x) \leq f(y) \text{ for all } x, y \in P \text{ with } x < y.$$

The basic operation permitted is a comparison $f(x) : f(y)$ at any two points of choice $x, y \in P$.
Obviously, one can check monotonicity by comparing the values of the function at cover pairs ((x, y) is called a cover pair in P if $x < y$ and there is no z in P such that $x < z < y$).
We will see for which posets this strategy is optimal and when one can do better by comparing also the values of the function at non-comparable elements of P.
We will also discuss methods of finding lower bounds for checking monotonicity.

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25 — Sektion V — G05-208 — 16:30

On the facet description of the k-cycle polytope

ANDREI HORBACH (Magdeburg)

We consider the k-cycle polytope which is the convex hull of characteristic vectors of all the k-cycles in the complete graph. We present a new class of facet inequalities having a similar structure to the regular path inequalities for the Travelling Salesman Polytope. We also give an example of a matroid approach to proving the facet property of new classes of inequalities for the 3-cycle polytope.

Freitag, 15.11.2001 — Zeit: 17:00

26 — Sektion I — G03-106 — 17:00

Exhaustive generation of association schemes

JAN DEGRAER (Ghent)

Starting from a basic backtracking algorithm for generating all distance regular graphs or association schemes with given parameters, we use several methods to reduce the search space to a feasible size for some non-trivial cases. First of all we use problem specific constraints to prune branches from the recursion tree, such as constraints on regularity, distance regularity, positive definiteness and rank of the associated matrices. Another way to limit the search space consists in generating a set of plausible substructures or subschemes and extending them to a full association scheme with the required properties. We present results obtained for the Perkel graph and some forgetful generalized quadrangles.

27 — Sektion II — G02-109 — 17:00

Overlapping congruent convex bodies

FERENC FODOR (Szeged, Hungary)

In this talk we shall discuss the following problem which was posed by J.W. Fickett in 1980. Let R and R' be congruent closed rectangular regions in the plane whose interiors intersect. What is the ratio

$$\frac{\mathrm{length}\ (\partial R \cap R')}{\mathrm{length}\ (\partial R' \cap R)}?$$

He conjectured that this ratio lies between $1/3$ and 3. Similar questions can be asked for n-dimensional parallelepipeds and other convex bodies.

28 — Sektion III — G02-111 — 17:00

Spoons, forks and upper antichains

MARCEL ERNÉ (Hannover)

A *spoon* in a (quasi-)ordered set Q is a directed principal dual ideal $\uparrow q = \{x \in Q : q \leq x\}$, and the generating element q is a *spoonhandle*. A *fork* is a non-linearly ordered subset with least element but no incomparable elements possessing a common upper bound in Q. We say Q is *spoonful* if there exists a cofinal subset consisting of spoonhandles or, equivalently, there is a cofinal subset containing no forks.

Theorem. The top element 1 of a lower pseudocomplemented poset P has a (unique) irredundant join-decomposition into prime elements iff $P \setminus \{1\}$ is spoonful. In that case, for each maximal upper decomposition of 1. It consists of all essential primes of P and, at the same time, of all atoms in the skeleton P_*, whence the MacNeille completion of P_* is isomorphic to the power set of A and of A_*. The cellularity of P is attained by any such A and therefore equal to the cardinality of the irredundant prime decomposition.

Among the applications are various decomposition theorems for topological spaces, ordered sets and diverse algebraic or combinatorial structures.

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29 — Sektion IV — G02-20 — 17:00

Finding Large Independent Sets in Polynomial Expected Time

AMIN COJA-OGHLAN (Berlin)

We consider instances of the maximum independent set problem that are constructed according to the following semirandom model. First, let $G_{n,p}$ be a random graph, and let S be a set consisting of k vertices, chosen uniformly at random. Then, let G_0 be the graph obtained by deleting all edges connecting two vertices in S. Finally, an adversary may add edges to G_0 that do not connect two vertices in S, thereby producing the instance $G = G^*_{n,p,k}$. We propose an algorithm that in the case $k \geq C\sqrt{n/p}$ on input G *within polynomial expected time* finds an independent set of size $\geq k$. Moreover, we prove that in the case $k \leq (1-\epsilon)\ln(n)/p$ this problem is hard. Our results extend the work of Feige and Krauthgamer, who designed an algorithm that with high probability finds a maximum independent set in the semirandom graph $G^*_{n,1/2,\Omega(\sqrt{n})}$. The analysis of the algorithm is based on a new large deviation result concerning the Lovász number of random graphs $G_{n,p}$. The large deviation result may be of independent interest.

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30 — Sektion V — G05-208 — 17:00

Series of Nearly Neighborly Centrally Symmetric 3-Spheres with Cyclic Group Action

FRANK LUTZ (Berlin)

Every d-dimensional sphere with n vertices has by Stanley's upper bound theorem at most as many i-dimensional faces as the cyclic polytope $C_d(n)$.

An analogous statement for centrally symmetric spheres is still unknown for $d \geq 5$. However, Stanley observed that a centrally symmetric sphere of dimension d can be at most *nearly neighborly*, i.e., if it attains the $\left(\lfloor\frac{d+1}{2}\rfloor - 1\right)$-skeleton of the corresponding cross-polytope on $n = 2k$ vertices.

For dimensions 3 and 4 Jockush gave an inductive construction that produces nearly neighborly centrally symmetric spheres for all $n = 2k$, $k \geq d+1$, thus providing a centrally symmetric upper bound theorem in these dimensions.

In this talk, we present a new series of nearly neighborly centrally symmetric 3-spheres with a transitive cyclic group action on $4m$, $m \geq 2$, vertices. Furthermore, we give some higherdimensional examples with few vertices.

Freitag, 15.11.2001 — Zeit: 17:30

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31 — Sektion I — G03-106 — 17:30

Sparse Parity-Check Matrices over Finite Fields

HANNO LEFMANN (Chemnitz)

For fixed positive integers k, q, r and large m, we investigate matrices with m rows and a maximum number $N_q(m, k, r)$ of columns, such that each column contains at most r nonzero entries from the finite field $GF(q)$ and each k columns are linearly independent over $GF(q)$. For even k we obtain the lower bounds $N_q(m, k, r) = \Omega(m^{kr/(2(k-1))})$, and $N_q(m, k, r) = \Omega(m^{(k-1)r/(2(k-2))})$ for odd k. Moreover, for $k = 2^i$ we show that $N_q(m, k, r) = \Theta(m^{kr/(2(k-1))})$ if $\gcd(k-1, r) = k-1$, while for arbitrary even $k \geq 4$ with $\gcd(k-1, r) = 1$ we have $N_q(m, k, r) = \Omega(m^{kr/(2(k-1))} \cdot (\log m)^{1/(k-1)})$. Furtherwore, for char $(GF(q)) > 2$ we have $N_q(m, 4, r) = \Theta(m^{\lceil 4r/3 \rceil /2})$, while for char $(GF(q)) = 2$ we can only show $N_q(m, 4, r) = O(m^{\lceil 4r/3 \rceil /2})$. Matrices, which fulfill these lower bounds, can be found in polynomial time. Our results extend and complement earlier results for the case $q = 2$.

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32 — Sektion II — G02-109 — 17:30

Bounds of the Topological Method

ARNOLD WASSMER (Berlin)

In 1978 László Lovász proved a lower bound to the chromatic number of a graph by topological methods. In this talk I will present an upper bound to this lower bound.
For a given graph G Lovász constructs a simplicial complex $B(G)$ with a Z_2-structure. Its Z_2-index $ind(B(G))$ is the dimension of the smallest sphere S^d into which the complex can be mapped equivariantly. Lovász proved this index as a lower bound for the chromatic number of the graph; $\chi(G) \geq ind(B(G)) + 2$. Using this he computed the chromatic number of the Kneser graphs. Now one could try to apply this method, for example, to the unit length graph of the plane R^2. But we will show that the topological method can give at most the well-known bound $\chi(R^2) \geq 4$. Our result is the following: If a graph G does not contain a complete bipartite graph $K_{l,m}$ as a subgraph then the index of its complex $B(G)$ is bounded by $ind(B(G)) \leq l + m - 3$.

This is joint work with Peter Csorba, Carsten Lange, and Ingo Schurr.

33 — Sektion III — G02-111 — 17:30

On cycles through specified vertices

TOBIAS GERLACH (Ilmenau)

For a set X of vertices of a graph fulfilling local connectedness conditions results on the existence of cycles containing X are presented.

This is joint work with Jochen Harant

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34 — Sektion IV — G02-20 — 17:30

Scheduling Malleable Parallel Tasks: An Asymptotic Fully Polynomial-Time Approximation Scheme

KLAUS JANSEN (Kiel)

A malleable parallel task is one whose execution time is a function of the number of processors allotted to it. We study the problem of scheduling a set of n independent malleable tasks on an arbitrary number m of parallel processors and propose an asymptotic fully polynomial time approximation scheme. For any fixed $\epsilon > 0$, the algorithm computes a non-preemptive schedule of length at most $(1 + \epsilon)$ times the optimum (plus an additive term). The main idea is an algorithm to convert an approximate preemptive schedule into an approximate non-preemptive schedule (via computing an unique allotment for almost all tasks). To do this we construct a sequence of wide and narrow rectangles (or fractions of task pieces). The wide rectangles are packed on a stack in non-increasing order of their widths. Then we split the stack into a constant number of groups and use a rounding technique to determine the unique allotment for almost all tasks.

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35 — Sektion V — G05-208 — 17:30

Stability and accuracy functions for vector perturbed combinatorial optimization problems

YURA NIKULIN (Magdeburg)

We consider a vector combinatorial optimization problem with Pareto and lexicographic optimality principles.
The set of feasible solutions is defined as a given and fixed family of subsets for some finite ground set. The accuracy and stability functions for efficient solution are described.

Freitag, 15.11.2001 — Zeit: 18:00

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36 — Sektion I — G03-106 — 18:00

A new nonexistence result for sharply multiple transitive permutation sets

JÖRN QUISTORFF (Hamburg)

Let $n \in \mathbb{N}$ and S_n be the symmetric group of all permutations of $\{1, 2, ..., n\}$. Let $t \in \mathbb{N}$ with $t \leq n$. A set $\Gamma \subseteq S_n$ is called a sharply t-transitive permutation set of degree n iff for all pairwise distinct $x_1, x_2, ..., x_t$ and all pairwise distinct $y_1, y_2, ..., y_t$, there is exactly one $\gamma \in \Gamma$ satisfying the t equations $\gamma(x_i) = y_i$ with $i \in \{1, 2, ..., t\}$.
The nonexistence of sharply t-transitive permutation sets of degree n with $4 \leq n - t \leq t$ is proved.
(Talk in German with English slides.)

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37 — Sektion II — G02-109 — 18:00

Kepler's false assertion on sphere packings

ACHILL SCHUERMANN (München)

How many equally sized spheres can be packed into a given container? This question was studied by Kepler in 1611 and he came to the conclusion that there is no better way to arrange the spheres than in the so called fcc lattice packing. Kepler's bold assertion implies what is known as the famous Kepler conjecture, namely that the density of the densest (infinite) packing is attained by a fcc lattice packing.
Kepler's original statement rather refers to a finite packing problem, a so called container problem. We answer the question whether the solutions to container problems may have lattice structure or not. We hereby in particular show that Kepler's assertion is false.

38 — Sektion III — G02-111 — 18:00

THOMAS BÖHME (Ilmenau)

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39 — Sektion IV — G02-20 — 18:00

Heuristic approaches to the reduction of Yutsis graphs

DRIES VAN DYCK (Ghent)

In various fields of theoretical physics, the quantum mechanical description of many-particle processes often requires an explicit transformation of the angular momenta of the subsystems among different coupling schemes. Such transformations are described by general recoupling coefficients. Yutsis, Levinson and Vanagas developed graphical techniques for representing a general recoupling coefficient as a cubic graph and they describe a set of reduction rules allowing a stepwise generation of a summation formula expressing the recoupling coefficient as a multiple sum over products of Wigner 6-j symbols. The aim is to find an optimal summation formula, i.e. with a minimum number of summation variables and Wigner 6-j symbols. In this paper we present some heuristic approaches based on these techniques, leading to more efficient formulae than the older algorithms.

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40 — Sektion V — G05-208 — 18:00

ULRICH BREHM (Dresden)

Samstag, 16.11.2001 — Zeit: 10:15

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41 — Sektion I — G03-106 — 10:15

On k-trestles in chordal 3-connected planar graphs

HEINZ-JÜRGEN VOSS (Dresden)

A k-trestle of a graph G is a 2-connected subgraph of G of maximum degree at most k. A graph is said to be chordal, if each cycle different from a 3-cycle has a chord. The toughness of a non-complete graph G is $\tau(G) = min(\frac{|S|}{\omega(G\setminus S)})$, where the minimum is to be taken over all nonempty vertex sets S, for which the number of components $\omega(G \setminus S)$ of $G \setminus S$ is at least 2. For a complete graph G let $\tau(G) = \infty$. We have proved that each chordal 3-connected planar graph G of toughness greater than $\frac{5}{6}$, or $\frac{7}{10}$, or $\frac{2}{3}$ has a 3-trestle, or a 4-trestle, or a 5-trestle, respectively. There are chordal 3-connected planar graphs of toughness $\frac{21}{29}$, or $\frac{51}{86}$, or $\frac{139}{259}$ without a 3-, or 4-, or 5-trestle, respectively.

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42 — Sektion II — G02-109 — 10.15

On a known but nevertheless new formula of a very old problem

ECKHARD MANTHEI (Mittweida)

Let $A = \{a_1, a_2, ..., a_s\}$ be a nonempty finite set of positive integers. Further, let $p_A(n)$ be the number of nonnegative solutions of $a_1x_1 + a_2x_2 + ... + a_sx_s = n$. We will show that

$$p_A(n) = \sum_{d|A} \sum_{i=1}^{m(d)} \mathrm{pcr}_d(i, n \bmod^* d) \binom{n+i-1}{i-1},$$

where pcr_d is for every $d \mid A$ a $(m(d), d)$-dimensional rational matrix. These matrices are also known as $m(d)$-dimensional d-periodic numbers or multidimensional prime circulators (a notion which goes back to Cayley). We will sketch the main steps of the proof and we will also present a Mathematica notebook to illustrate an accompanying algorithm. The heart of the proof and algorithm is inverse finite Fourier transformation. Once the data, i. e. the matrices pcr_d, is computed, $p_A(n)$ provides exact solutions even for arguments n of size 10^{1000}.

43 — Sektion III — G02-111 — 10:15

Difference labelling of the generalized source-join of digraphs

MARTIN SONNTAG (Freiberg)

A digraph G is a *difference digraph* iff there exists an $S \subset I\!N^+$ such that G is isomorphic to the digraph $DD(S) = (V, E)$, where $V = S$ and $E = \{(i, j) : i, j \in V \ \wedge \ i - j \in V\}$.
For some classes of digraphs, e.g. alternating trees, oriented cycles, tournaments etc., it is known, under which conditions these digraphs are difference digraphs. We generalize the so-called *source-join* (a construction principle to obtain a new difference digraph from two given ones) and construct a difference labelling for the source-join of an even number of difference digraphs.
As an application, we get a sufficient condition guaranteeing that certain (non-alternating) trees are difference digraphs.

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44 — Sektion IV — G02-20 — 10:15

Triangle and hexagon gameboard Ramsey numbers

JENS-P. BODE (Braunschweig)

Triangle gameboards B_i are parts of the Euclidean triangle tessellation of the plane, where B_1 consists of one triangle, B_2 consists of all six triangles surrounding one vertex, and B_{i+2} consists of all triangles of B_i and all its neighbours. Hexagon gameboards are defined analogously for the Euclidean hexagon tessellation. If the gameboards are interpreted as graphs then for given graphs G and H, the gameboard Ramsey number $r(G, H)$ is the smallest number i such that every two-coloring of the edges of B_i contains the graph G in the first color or the graph H in the second color. First results concerning existence and exact values are given.

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45 — Sektion V — G03-308 — 10:15

Die Evolution als Vorbild zur Lösung komplexer Optimierungsprobleme

GUNTER LASSMANN (Berlin)

Liegt ein Optimierungsproblem mit einer klar definierten Nutzenfunktion vor und lassen sich die verwendeten Algorithmen einfach charakterisieren, so ist dieses Problem vielleicht durch ein Verfahren lösbar, das die Evolution nachbildet. Dabei können verschiedene “Verfahren” aus verschiedenen Phasen der Evolution, wie etwa die ungeschlechtliche und geschlechtliche Vermehrung, erfolgreich adaptiert werden. So realisierte Verfahren werden auf verschiedenen Abstraktionsebenen, entsprechend Enzymen, Genen und Fortpflanzungsstrategien am Beispiel des MINESWEEPER-Problems erläutert. Während des Vortrags findet in einem kleinen Biotop auf einem Laptop eine kleine Evolution statt, die zwischendurch verfolgt wird. Als weitere Anwendung wird die Qualitätsprüfung von Zufallsgeneratoren vorgestellt. Vorteil der Evolutionsverfahren ist die schnelle Erzeugung von brauchbaren Anfangslösungen, wobei die Resultate manchmal überraschend sind. Nachteil dieser Verfahren ist die Unklarheit wie optimal die gefundenen Lösungen sind (wie im richtigen Leben) und der rechnerische Aufwand.

Samstag, 16.11.2001 — Zeit: 10:45

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46 — Sektion I — G03-106 — 10:45

On the Linear Intersection Number of Graphs

MARIAN MARGRAF (Kiel)

A partial linear space is an incidence structure $\pi = (P, \mathcal{L})$ such that for every two distinct points $p, q \in P$ there is at most one line $l \in \mathcal{L}$ with $p, q \in l$ and every line contains at least two points. Let $G_\pi = (\mathcal{L}, E := \{\{l, g\}; l \neq g \in \mathcal{L},\ l \cap g \neq \emptyset\})$ be the intersection graph of π. Obviously, for every graph G there is a partial linear space π such that $G = G\pi$. Define

$$v(G) = \min\{v \in \mathbb{N};\ \text{there exists a partial linear space } \pi \text{ on } v \text{ points such that } G_\pi = G\},$$

the so-called linear intersection number of G. A famous conjecture of Erdös, Faber and Lovász says that the chromatic index of a partial linear space $\pi = (P, \mathcal{L})$ is at most $|P|$. We show that this conjecture is true if and only if $\chi(G) \leq v(G)$ for every graph G. Moreover, we calculate lower and upper bounds for the linear intersection number.

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47 — Sektion II — G02-109 — 10:45

A property of Macaulay posets and its applications

UWE LECK (Rostock)

Macaulay posets are those ranked posets in which an analog of the Kruskal-Katona theorem holds. Together with Sergei Bezrukov and Konrad Engel we studied the following question: For which Macaulay posets P is the lexicographic order a Macaulay order for $P \times B_1$, where B_n denotes the Boolean lattice of order n. It turned out that this is the case iff P satisfies a certain condition that is closely related to additivity and which we call the Z-property. Moreover, if P has the Z-property, then also $P \times B_1$. Hence, in this case $P \times B_n$ is a Macaulay poset for any n. Surprisingly, the Z-property can also be used to obtain simple proofs of some previously known inequalities for families of finite sets.

48 — Sektion III — G02-111 — 10:45

Large Competition hypergraphs

HANNS-MARTIN TEICHERT (Lübeck)

If $D = (V, A)$ is a digraph, its *competition hypergraph* $C\mathcal{H}(D)$ has vertex set V and $e \subseteq V$ is an edge of $C\mathcal{H}(D)$ iff $|e| \geq 2$ and there is a vertex $v \in V$, such that $e = \{w \in V | (w, v) \in A\}$. Beside a motivation for this new concept, closely related to the well known competition graphs, we present several properties of competition hypergraphs and discuss connections to corresponding results for competition graphs.

This is joint work with M. Sonntag

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49 — Sektion IV — G02-20 — 10:45

King Graph Ramsey Numbers

MARTIN HARBORTH (Braunschweig)

A king graph KG_n has n^2 vertices corresponding to the n^2 square cells of an $n \times n$–chessboard and the edges are to all squares (vertices) being attacked by a king. In other words, the vertices and edges of KG_n are the vertex points and the sides or diagonals of the squares of an $(n-1) \times (n-1)$–chessboard, respectively. For given subgraphs G and H the Ramsey number $R = R(G, H)$ is the smallest R such that any 2-coloring of the edges of KG_R contains G with all edges of the first color or H with all edges of the second color. Some results on existence and non-existence of $R(G, H)$ and some exact values are given.

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50 — Sektion V — G03-308 — 10:45

Teaching with Graffiti

GUNNAR BRINKMANN (Bielefeld)

In this talk I will demonstrate how the computer program *graffiti* developed by Siemion Fajtlowicz and Ermelinda Delavina can be used in seminar-like courses to make students familiar with basic graph theory concepts and proof techniques and to give them first basic experiences in research.

Samstag, 16.11.2001 — Zeit: 11:15

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51 — Sektion I — G03-106 — 11:15

The Chromatic Number, Steiner Trees and the Travelling Salesman. Is one algorithm enough for everything?

ANDRÉ POENITZ (Mittweida)

In the field of the computation of graph invariants much work is devoted to the construction of fast and efficient algorithms. However, this process is often very time-consuming and results might not meet practical requirements. Reasons are e.g. a development time that dominates run time, or a lack of adaptability to slightly augmented requirements in the problem space.
In contrast, this talk will investigate a possibility to generate new algorithms quickly by using the so-called “composition method” which has been applied successfully to various problems ranging from reliability measures over chromatic invariants up to the travelling salesman problem.
Algorithms created by that method are usually less efficient than hand-optimized ones, yet they could be implemented within a few minutes once some formalization of the problem has been done.

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52 — Sektion II — G02-109 — 11:15

Some new problems on Sperner Families

IAN ROBERTS (Casuarina, Australien)

A flat antichain A in the Boolean lattice on $[n]$ is an antichain in which $|B| - |C| \leq 1$ for all $B, C \in A$. Lieby and Kisvolcsey (1999-2000) have proved that every antichain on [n] has a corresponding flat antichain with the same size and volume (sum of the cardinalities of the sets). Some recently posed problems concerning flat antichains and problems involving sizes of shadows will be presented.

53 — Sektion III — G02-111 — 11:15

Perfectness is an Elusive Graph Property

STEFAN HOUGARDY (Berlin)

A graph property is called elusive (or evasive) if every algorithm for testing this property has to read in the worst case $\binom{n}{2}$ entries of the adjacency matrix of the given graph. Several graph properties have been shown to be elusive, e.g. planarity or k-colorability. A famous conjecture of Karp (1973) says that every non-trivial monotone graph property is elusive. We prove that a non-monotone but hereditary graph property is elusive: perfectness.

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54 — Sektion IV — G02-20 — 11:15

Triangle and hexagon gameboard Ramsey numbers

JENS-P. BODE (Braunschweig)

Triangle gameboards B_i are parts of the Euclidean triangle tessellation of the plane, where B_1 consists of one triangle, B_2 consists of all six triangles surrounding one vertex, and B_{i+2} consists of all triangles of B_i and all its neighbours. Hexagon gameboards are defined analogously for the Euclidean hexagon tessellation. If the gameboards are interpreted as graphs then for given graphs G and H, the gameboard Ramsey number $r(G, H)$ is the smallest number i such that every two-coloring of the edges of B_i contains the graph G in the first color or the graph H in the second color. First results concerning existence and exact values are given.

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55 — Sektion V — G03-308 — 11:15

Goblin: A Software Package for Graph Algorithms

BERNHARD SCHMIDT (Augsburg)

Goblin is a free userfriendly software package for graph algorithms which has been developed by Christian Fremuth-Paeger at the University of Augsburg. Some of the capabilities of Goblin will be explained and demonstrated. Goblin supports

- visualization of graph algorithms (tracing)
- graph editing
- graph coloring
- network flows
- matching problems
- TSP

Samstag, 16.11.2001 — Zeit: 11:45

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56 — Sektion I — G03-106 — 11:45

Prime Labelling of Trees

OLEG PIKHURKO (Cambridge, England)

A graph G is m-*prime* if there is an injection $l : V(G) \to \{1, \dots, m\}$ such that any two adjacent vertices receive coprime labels.
Around 1980 Entringer conjectured that every tree of order n is n-prime. We show that every tree of order n is m-prime, where $m(n) = (1 + o(1))n$.

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57 — Sektion II — G02-109 — 11:45

HAROUT AYDINIAN (Bielefeld)

58 — Sektion III — G02-111 — 11:45

On $L(d,1)-$ labellings of graphs

ANJA KOHL (Freiberg)

Given a graph $G=(V,E)$ and nonnegative integers d and k, an $L(d,k)-$labelling of G is a function $f:V(G)\rightarrow\{0,1,...\}$ such that for any two vertices x and y

1. $\mid f(x)-f(y)\mid\geq d$ if $d(x,y)=1$ and
2. $\mid f(x)-f(y)\mid\geq k$ if $d(x,y)=2$.

The $L(d,k)-$number of G, denoted by $\lambda_{d,k}(G)$, is the smallest number m such that G has a $L(d,k)-$labelling with $max\{f(x):x\in V(G)\}=m$.
In this talk we will present some bounds for $\lambda_{d,1}(G)$. Moreover, we will determine $\lambda_{d,1}(G)$ for special classes of graphs, e.g. paths, cycles and complete $l-$partite graphs.

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59 — Sektion IV — G02-20 — 11:45

JULIAN PFEIFLE (Berlin)

In 1988, Kalai constructed “many triangulated d-spheres”: for fixed $d>3$ and large n, the number of triangulated d-spheres on n vertices by far exceeds the number of combinatorial types of simplicial $(d+1)$-polytopes. However, for $d=3$ Kalai’s construction yields only polytopal spheres. We present a new construction that for large n produces – for the first time – far more simplicial 3-spheres than there are types of simplicial 4-polytopes.

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60 — Sektion V — G03-308 — 11:45

A knowledge-based system for the support of graphtheoretical proofs

DIETER GERNERT (München)

The knowledge-based system KBGRAPH uses a file which includes more than 1500 theorems from graph theory. Its main purpose is to support proofs of undecided graphtheoretical conjectures. The input consists of known properties of a class graphs-particularly the class of possible couterexamples to a certain hypothesis-and the system supplies futher properties of that class (including more severe inclusions for graph invariants). In simple cases an automatic proof is supplied; otherwise the partial proofs and new restrictions delivered by the system may be helpful for the remaining task.
In this lecture, principles and performance of KBGRAPH are shortly reviewed. Special experience collected by working with the system are reported. This includes patial proofs of some interesting conjectures.
Special hint: After the regular time of the lecture, a computer demonstration will be performed. Further demonstrations possibly can be arranged outside the schedule for small groups of particularly interested colleagues. It is planned to give away copies of the program to all who are seriously interested and want to join an informal network for the exchange of information and the use and improvement of the system.

Samstag, 16.11.2001 — Zeit: 14:00

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61 — Sektion I — G03-106 — 14:00

On the Existence of a PBD$(30, \{4, 5, 7, 8^*\})$

MARTIN GRÜTTMÜLLER (Rostock)

Let K be a set of positive integers. Then a *pairwise balanced design* PBD(v, K) of order v with block sizes from K is a pair $(V, \mathcal{B})$, where V is a finite set (the *point set*) of cardinality v and $\mathcal{B}$ is a family of subsets (called *blocks*) of V which satisfy the following properties: (i) every pair of distinct elements of V occurs in exactly one block of $\mathcal{B}$; (ii) if $B \in \mathcal{B}$, then $|B| \in K$. In 1983 Drake and Larson [Pairwise Balanced Designs whose Line Sizes do not Divide Six. J. of Combin. Theory Ser. A 34, 1983, 266-300] answered the existence question of PBD$(v, \mathbb{N} \setminus \{2, 3, 6\})$s for all v except $v = 30$. A year later Drake and Larson [A Quest for Certain Linear Spaces on Thirty Points. J. Stat. Plann. Infer. 10, 1984, 241-255] considered existence conditions for the remaining case and, in particular, proved that the block sizes must be from the set $\{4, 5, 7, 8\}$. In this talk, we will prove by an exhaustive search method that there does not exist a pairwise balanced design on 30 points with blocks of size 4,5,7 and exactly one block of size 8.

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62 — Sektion II — G02-109 — 14:00

CARSTEN LANGE (Berlin)

63 — Sektion III — G02-111 — 14:00

STEPHAN BRANDT (Ilmenau)

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64 — Sektion IV — G02-20 — 14:00

Lattice paths not touching a given boundary

ULRICH TAMM (Chemnitz)

Lattice paths are enumerated which first touch a periodic boundary at time n. Following a probabilistic method introduced by Gessel, for period length 2 formulae are obtained for a wide class of boundaries. This allows to give the generating function for paths not crossing or touching the diagonal $cx = 2y$ for odd c and to obtain a closed formula similar to the ballot numbers for the sum of the entries of two two-dimensionanal arrays related to these boundaries. The method also gives a solution to a closely related problem of Berlekamp, which arose in the study of a class of convolutional codes.

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65 — Sektion V — G03-308 — 14:00

Approximation Algorithms for General Packing Problems and Application in Multicast Congestion Problem

HU ZHANG (Kiel)

In this talk we present approximation algorithms based on a Lagrangian decomposition via a logarithmic potential reduction to solve a general packing or min-max resource sharing problem with M nonnegative convex constraints on a convex set B. We generalize a method by Grigoriadis et al to the case with weak approximate block solvers (*i.e.* with only constant, logarithmic or even worse approximation ratios). We show that the algorithm needs at most $O(M(\ln M + \varepsilon^{-2} \ln \varepsilon^{-1}))$ calls to the block solver, a bound independent of the data and the approximation ratio of the block solver. For small approximation ratios the algorithm needs at most $O(M(\ln M + \varepsilon^{-2}))$ calls to the block solver. As an application we study the problem of minimizing the maximum edge congestion in a multicast communication network. Interestingly the block problem here is the classical Steiner tree problem that can be solved only approximately. We show how to use approximation algorithms for the Steiner tree problem to solve the multicast congestion problem approximately.

Samstag, 16.11.2001 — Zeit: 14:30

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66 — Sektion I — G03-106 — 14:30

The near resolvable 2-(13,4,3) designs and 13-player whist tournaments

HARRI HAANPÄÄ (Helsinki)

A 2-(v, k, λ) design (V, B) is near resolvable, if its blocks can be partitioned into near parallel classes, each of which consists of pairwise disjoint blocks whose union is V minus one point. Such a partition is a near resolution of the design. By using a correspondence between the near resolutions of a design and a particular class of codes, we classify the near resolvable 2-(13,4,3) designs and their resolutions. For $v = 4q + 1$ a v-player whist tournament $\mathrm{Wh}(v)$ is essentially a near resolution of a 2-$(v, 4, 3)$ design, where each block is partitioned into two pairs such that every 2-element subset of V occurs as a pair exactly once in the tournament. We classify $\mathrm{Wh}(13)$ and the special cases of directed and triplewhist tournaments, and find that no 13-player triplewhist tournament exists.

This is joint work with Petteri Kaski

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67 — Sektion II — G02-109 — 14:30

A Linear Time Approximation Algorithm for the Weighted Matching Problem

DORATHA DRAKE (Berlin)

The weighted matching problem is defined as follows: Let $G = (V, E)$ be a graph and $w : E \to \mathbb{R}_+$ be a function whcih assigns a weight to each of th eedges of G. Then the weight $w(F)$ of a subset $F \subseteq E$ of the edges of G is defined as $w(F) := \sum_{e \in F} w(e)$. Now the weighted matching problem is to find a matching M in G that has maximum weight.
The fastest algorith known today for solving the weighted matching problem in general graphs is due to Gabow (1990) and has a running time of $O(|V||E| + |V|^2 \log |V|)$.
We present a linear time approximation algorithm with a performance ratio of $1/2$ for finding a maximum weight matching in an arbitrary graph.

This is joint work with Stefan Hougardy.

68 — Sektion III — G02-111 — 14:30

Bonferroni-Ungleichungen durch chordale Graphen

KLAUS DOHMEN (Mittweida)

Sei $G = (V, E)$ ein chordaler Graph und $\{A_v\}_{v \in V}$ eine endliche Familie von Ereignissen. Wir zeigen, dass ganz allgemein gilt:

$$\Pr\left(\bigcup_{v \in V} A_v\right) = \sum_{\substack{I \subseteq V,\, I \neq \emptyset \\ I \text{ Clique von } G}} (-1)^{|I|-1} \Pr\left(\bigcap_{i \in I} A_i\right).$$

Als Spezialfälle erhalten wir u.a. die Ungleichungen von Boole (1854), Kounias (1968), Hunter (1976), Seneta (1988) und Galambos-Xu (1990).

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69 — Sektion IV — G02-20 — 14:30

DIETMAR CIESLIK (Greifswald)

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70 — Sektion V — G03-308 — 14:30

Average Case Analysis of a Hard Dial-a-Ride Problem

TILL NIERHOFF (Berlin)

In the dial-a-ride-problem (DARP) objects have to be moved between given sources and destinations in a transportation network by means of a server. The goal is to find a shortest transportation for the server. We study the DARP when the underlying transportation network forms a caterpillar. This special case arises from an application to elevator systems and is strongly NP-hard in the worst case. We prove that in a probabilistic setting there exists a polynomial time algorithm which almost surely finds an optimal solution. Moreover, with high probability the optimality of the solution found can be certified efficiently. We also examine the complexity of DARP in a semi-random setting and in the unweighted case.

Samstag, 16.11.2001 — Zeit: 15:00

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71 — Sektion I — G03-106 — 15:00

Hyperplanes of dual polar spaces

HARM PRALLE (Braunschweig)

The dual Δ of a polar space Π of finite rank $n \geq 3$ is the point-line geometry with points (lines) the totally singular $(n-1)$- ($(n-2)$-) spaces of Π.

The complement of a hyperplane H of a dual polar space Δ, i.e. the geometry of the elements of Δ not contained in H, is called an *affine dual polar space*. Affine dual polar spaces belong to the diagram arising from C_n by reflecting it in the middle (denoting the dualizing process) and then replacing the left-most stroke representing a generalized quadrangle by a stroke representing an affine generalized quadrangle. In the finite case, flag-transitive affine dual polar spaces have been classified recently. We present some results about hyperplanes of dual polar spaces not admitting flag-transitive complements.

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72 — Sektion II — G02-109 — 15:00

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73 — Sektion III — G02-111 — 15:00

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74 — Sektion IV — G02-20 — 15:00

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75 — Sektion V — G03-308 — 15:00

Optimal Multileaf Collimator Field Segmentation for Inverse Radiotherapy Planning

KONRAD ENGEL (Rostock)

Modern radiotherapy planning algorithms are composed of several routines. There are two essential steps. In the first step a small number of intensity modulated fields are determined with the aim that the planning target area receives homogenously a fixed dose and that regions of interest are protected as good as possible. Here the intensity of the beam through the rectangle given by field breadth and field length is not homogenous, but modulated, i.e., there is a compensation depending on the point of the rectangle. After discretization this intensity modulation is described by an intensity map which is mathematically an $m \times n$ matrix with nonnegative entries. A modern way of realizing such an intensity map is the usage of a multileaf collimator that, by means of his leaves, opens and closes certain regions of the rectangle. Several leaf–positions, called segments, must be superposed in order to realize the intensity map. The second essential step in planning algorithms is the determination of a small number of segments (associated with monitor units) which realize the intensity map in small total time. In our talk we will present a new algorithm for this second step.

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Vortragende

Freitag, 15.11.2001, Sektion I, G03-106

Chair:

Zeit		
14:00	**Peter Tittmann** Chromatic Polynomials and Vertex Separators	**1**
14.30	**Astrid Reifegerste** On diagrams and forbidden patterns of permutations	**6**
15:00	**Thorsten Theobald** A new identity on Catalan numbers in real geometry	**11**
15.30	**Jacob Katriel** Asymptotic properties of the spectra of conjugacy class-sums in the symmetric group	**16**

Freitag, 15.11.2001, Sektion I, G03-106

Chair:

Zeit		
16:30	**Olof Heden** On the classification of binary perfect 1-error correcting codes	**21**
17:00	**Jan Degraer** Exhaustive generation of association schemes	**26**
17:30	**Hanno Lefmann** Sparse Parity-Check Matrices over Finite Fields	**31**
18:00	**Jörn Quistorff** A new nonexistence result for sharply multiple transitive permutation sets	**36**

Freitag, 15.11.2001, Sektion II, G02-109

Chair:

Zeit		
14:00	**Ingo Althöfer** Inventing game variants with computer help	**2**
14:30	**Christian Deppe** A new upper bound for the Renyi-Ulam Game with fixed number of lies	**7**
15:00	**Bernd Reichel** On the descriptional complexity of some variants of Lindenmayer systems	**12**
15:30	**Annegret Wagler** How Imperfect are Webs and Antiwebs?	**17**

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Freitag, 15.11.2001, Sektion II, G02-109

Chair:

Zeit		
16:30	**Martin Henk** Free planes in lattice sphere packings	**22**
17:00	**Ferenc Fodor** Overlapping congruent convex bodies	**27**
17:30	**Arnold Wassmer** Bounds of the Topological Method	**32**
18:00	**Achill Schuermann** Kepler's false assertion on sphere packings	**37**

Freitag, 15.11.2001, Sektion III, G02-111

Chair:

Zeit	
14:00	**Michael Braun** **3** q-Analoga kombinatorischer t-Designs
14:30	**Sabine Giese** **8** Divisible Designs and finite Laguerre Geometries
15:00	**Patric Östergård** **13** There Exist Nonisomorphic STS(19) with Equivalent Point Codes
15:30	**Harald Gropp** **18** Colouring configurations

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Freitag, 15.11.2001, Sektion III, G02-111

Chair:

Zeit	
16:30	**Deryk Osthus** **23** Topological cliques in graphs of large girth
17:00	**Marcel Erné** **28** Spoons, forks and upper antichains
17:30	**Tobias Gerlach** **33** On cycles through specified vertices
18:00	**Thomas Böhme** **38**

Freitag, 15.11.2001, Sektion IV, G02-20

Chair:

Zeit		
14:00	**Janka Chlebikova** Precoloring extension problem on partial k-trees	**4**
14:30	**Ingo Schiermeyer** Rainbow Colourings	**9**
15:00	**Arnfried Kemnitz** $[r, s, t]$-Colorings of Graphs	**14**
15:30	**Margit Voigt** Characterization of graphs dominated by a path	**19**

Freitag, 15.11.2001, Sektion IV, G02-20

Chair:

Zeit		
16:30	**Marina Kyureghyan** Complexity of monotonicity checking	**24**
17:00	**Amin Coja-Oghlan** Finding Large Independent Sets in Polynomial Expected Time	**29**
17:30	**Klaus Jansen** Scheduling Malleable Parallel Tasks: An Asymptotic Fully Polynomial-Time Approximation Scheme	**34**
18:00	**Dries Van Dyck** Heuristic approaches to the reduction of Yutsis graphs	**39**

Freitag, 15.11.2001, Sektion IV, G02-20

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Freitag, 15.11.2001, Sektion V, G05-208

Chair:

Zeit	
14:00	**Matthias Kriesell** **5** Mader's Conjecture on Extremely Critically Connected Graphs
14:30	**Daniela Kühn** **10** Minors in locally sparse graphs
15:00	**Massimiliano Marangio** **15** Totalchromatische Zahl von Produktgraphen
15:30	**Thomas Prellberg** **20** A proof of the Monotonicity Conjecture by Friedman, Joichi, and Stanton.

Freitag, 15.11.2001, Sektion V, G05-208

Chair:

Zeit	
16:30	**Andrei Horbach** **25** On the facet description of the k-cycle polytope
17:00	**Frank Lutz** **30** Series of Nearly Neighborly Centrally Symmetric 3-Spheres with Cyclic Group Action
17:30	**Yura Nikulin** **35** Stability and accuracy functions for vector perturbed combinatorial optimization problems
18:00	**Ulrich Brehm** **40**

Sonnabend, 16.11.2001, Sektion I, G03-106

Chair:

Zeit		
10:15	**Heinz-Jürgen Voss** On k-trestles in chordal 3-connected planar graphs	**41**
10:45	**Marian Margraf** On the Linear Intersection Number of Graphs	**46**
11:15	**André Poenitz** The Chromatic Number, Steiner Trees and the Travelling Salesman. Is one algorithm enough for everything?	**51**
11:45	**Oleg Pikhurko** Prime Labelling of Trees	**56**

Sonnabend, 16.11.2001, Sektion II, G02-109

Chair:

Zeit		
10:15	**Eckhard Manthei** On a known but nevertheless new formula of a very old problem	**42**
10:45	**Uwe Leck** A property of Macaulay posets and its applications	**47**
11:15	**Ian Roberts** Some new problems on Sperner Families	**52**
11:45	**Harout Aydinian**	**57**

Sonnabend, 16.11.2001, Sektion II, G02-109

Chair:

Zeit		
14:00	**Carsten Lange**	**62**
14:30	**Doratha Drake** A Linear Time Approximation Algorithm for the Weighted Matching Problem	**67**
15:00		**72**

Sonnabend, 16.11.2001, Sektion II, G02-109

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15:00		**72**

Sonnabend, 16.11.2001, Sektion III, G02-111

Chair:

Zeit		
10:15	**Martin Sonntag** Difference labelling of the generalized source-join of digraphs	**43**
10:45	**Hanns-Martin Teichert** Large Competition hypergraphs	**48**
11:15	**Stefan Hougardy** Perfectness is an Elusive Graph Property	**53**
11:45	**Anja Kohl** On $L(d,1)-$ labellings of graphs	**58**

Sonnabend, 16.11.2001, Sektion III, G02-111

Chair:

Zeit		
14:00	**Stephan Brandt**	**63**
14:30	**Klaus Dohmen** Bonferroni-Ungleichungen durch chordale Graphen	**68**
15:00		**73**

Sonnabend, 16.11.2001, Sektion IV, G02-20

Chair:

Zeit		
10:15	**Jens-P. Bode** Triangle and hexagon gameboard Ramsey numbers	**44**
10:45	**Martin Harborth** King Graph Ramsey Numbers	**49**
11:15	**Frank Vallentin** Lattice Coverings	**54**
11:45	**Julian Pfeifle**	**59**

Sonnabend, 16.11.2001, Sektion IV, G02-20

Chair:

Zeit		
14:00	**Ulrich Tamm** Lattice paths not touching a given boundary	**64**
14:30	**Dietmar Cieslik**	**69**
15:00		**74**

Sonnabend, 16.11.2001, Sektion V, G03-308

Chair:

Zeit		
10:15	**Gunter Laßmann** Die Evolution als Vorbild zur Lösung komplexer Optimierungsprobleme	**45**
10:45	**Gunnar Brinkmann** Teaching with Graffiti	**50**
11:15	**Bernhard Schmidt** Goblin: A Software Package for Graph Algorithms	**55**
11:45	**Dieter Gernert** A knowledge-based system for the support of graphtheoretical proofs	**60**

Sonnabend, 16.11.2001, Sektion V, G03-308

Chair:

Zeit		
14:00	**Hu Zhang** Approximation Algorithms for General Packing Problems and Application in Multicast Congestion Problem	**65**
14:30	**Till Nierhoff** Average Case Analysis of a Hard Dial-a-Ride Problem	**70**
15:00	**Konrad Engel** Optimal Multileaf Collimator Field Segmentation for Inverse Radiotherapy Planning	**75**