

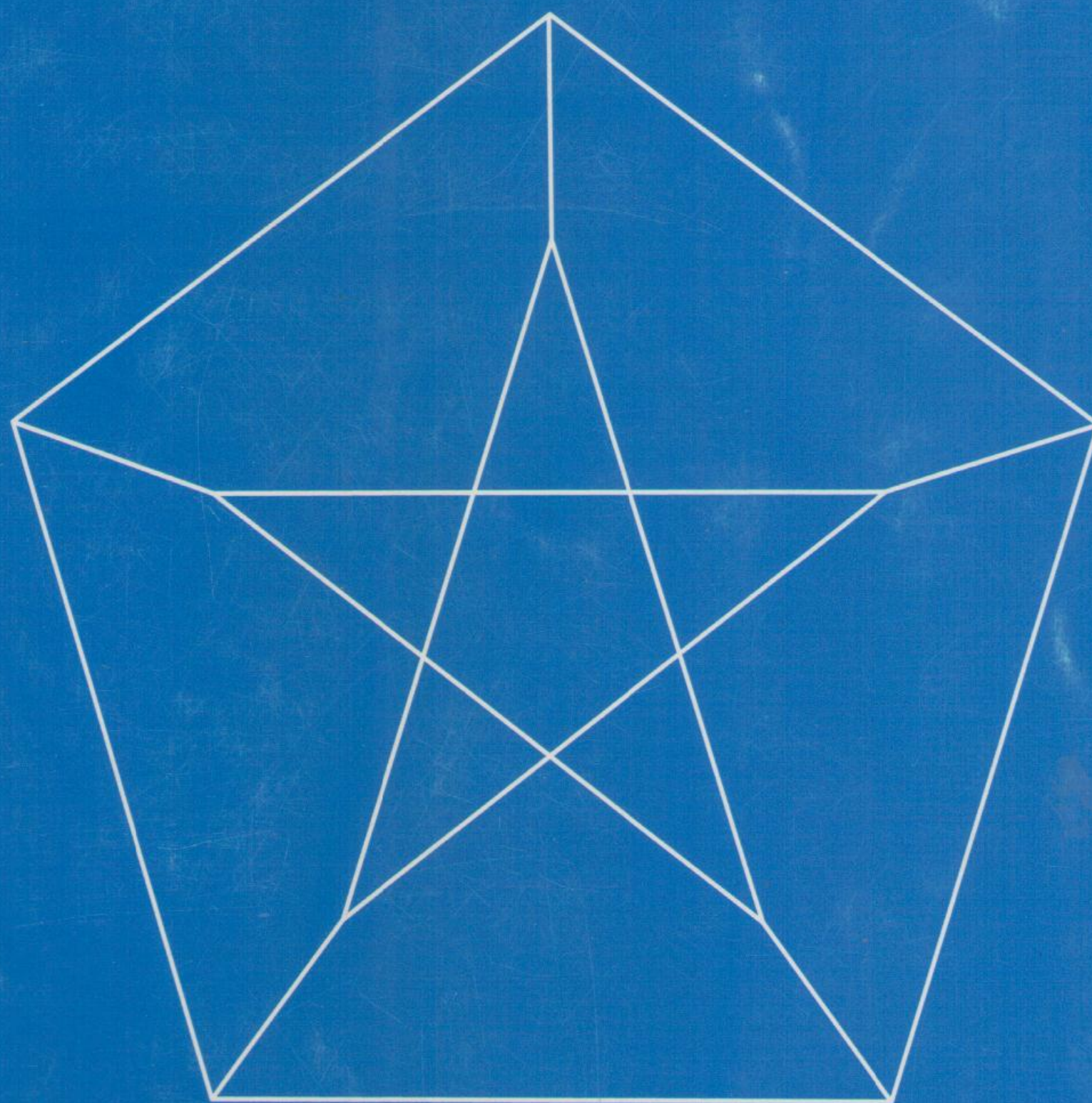
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Contents

Contributions

<i>V.E. Alekseev, D.V. Korobitsyn and V.V. Lozin</i> Boundary classes of graphs for the dominating set problem	1
<i>T. Biedl, E.D. Demaine, C.A. Duncan, R. Fleischer and S.G. Kobourov</i> Tight bounds on maximal and maximum matchings	7
<i>B. Bollobás and V. Nikiforov</i> Hermitian matrices and graphs: singular values and discrepancy	17
<i>J.I. Brown, C.A. Hickman and R.J. Nowakowski</i> The k -fractal of a simplicial complex	33
<i>X.E. Chen</i> On the largest eigenvalues of trees	47
<i>K.Ch. Das</i> Maximizing the sum of the squares of the degrees of a graph	57
<i>T. Došlić, D. Svrtan and D. Veljan</i> Enumerative aspects of secondary structures	67
<i>L. Gargano, M. Hammar, P. Hell, L. Stacho and U. Vaccaro</i> Spanning spiders and light-splitting switches	83
<i>G. Ge and A.C.H. Ling</i> Group divisible designs with block size four and group type $g^u m^1$ for small g	97
<i>M.J. Grannell and V.P. Korzhik</i> Nonorientable biembeddings of Steiner triple systems	121
<i>T. Hasunuma, Y. Kikuchi, T. Mori and Y. Shibata</i> On the number of cycles in generalized Kautz digraphs	127
<i>F.B. Holt</i> Blending simple polytopes at faces	141
<i>M. Kanovich</i> Finding direct partition bijections by two-directional rewriting techniques	151
<i>M. Lemos</i> Elements belonging to triads in 3-connected matroids	167

<i>M. Lepović</i> On integral graphs which belong to the class $\overline{\alpha K_a \cup \beta K_{b,b}}$	183
<i>D. Levy</i> Injectivity and surjectivity of Collatz functions	191
<i>E.G. Mphako</i> H-lifts of tangential k -blocks	201
<i>A. Nakamoto, S. Negami and K. Ota</i> Chromatic numbers and cycle parities of quadrangulations on nonorientable closed surfaces	211
<i>M.I. Ostrovskii</i> Minimal congestion trees	219
<i>C. Peters and L. Volkmann</i> Vertex 6-pancyclic in-tournaments	227
<i>N. Polat</i> Fixed finite subgraph theorems in infinite weakly modular graphs	239
<i>M. Stehlík</i> A generalisation of matching and colouring	257
<i>L. Volkmann and S. Winzen</i> Almost regular multipartite tournaments containing a Hamiltonian path through a given arc	267
<i>L. Xiong, H.J. Broersma, X. Li and M. Li</i> The hamiltonian index of a graph and its branch-bonds	279
<i>P.T. Young</i> Degenerate and n -adic versions of Kummer's congruences for values of Bernoulli polynomials	289
Notes	
<i>R.E.L. Aldred and C. Thomassen</i> Graphs with not all possible path-kernels	297
<i>A.D. Flaxman</i> A sharp threshold for a random constraint satisfaction problem	301
<i>T. Fujisaki</i> A construction of amorphous association scheme from a pseudo-cyclic association scheme	307
<i>H. Galeana-Sánchez and R. Rojas-Monroy</i> On monochromatic paths and monochromatic 4-cycles in edge coloured bipartite tournaments	313
<i>P. Hell and J.J. Montellano-Ballesteros</i> Polychromatic cliques	319

M. Herzog, G. Kaplan and A. Lev

Representation of permutations as products of two cycles

Discrete Mathematics 285 (2004) 1–6

www.elsevier.com/locate/disc

J. Honkala and M. Rigo

Decidability questions related to abstract numeration systems

329

D.D.-F. Liu

Circular chromatic number for iterated Mycielski graphs

335

H. Ma and H. Ren

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341

N. Sendrier

Linear codes with complementary duals meet the Gilbert–Varshamov bound

Received 10 March 2003; accepted 13 April 2004

345

J. Talbot

A new Bollobás-type inequality and applications to t -intersecting families of sets

349

I. Tomescu

Sunflower hypergraphs are chromatically unique

355

L. Volkmann

Hamiltonian paths containing a given arc, in almost regular bipartite tournaments

359

Author index to volume 285

365

Guide for authors

367

Typically, a problem, which is NP-hard in general graphs, becomes tractable (solvable in polynomial time) when restricted to some particular classes of graphs. A helpful tool for classification of graph classes according to the time complexity of a given NP-hard problem is the notion of a boundary class. Originally, it has been introduced with respect to the independent set problem [2]. In the present paper, we define this notion in its general form in Section 2 and apply it to the dominating set problem in Section 3. As a result, we discover three boundary classes for the problem in question.

All graph classes in this paper are *hereditary*, i.e. closed under deletion of vertices. A hereditary class is called *monotone* if it is closed under deletion of edges. If a graph G does not contain any induced subgraph isomorphic to a graph in a set Y , we say that G is Y -free. The set of all Y -free graphs will be denoted $\text{Free}(Y)$. It is well known that for every hereditary class of graphs X , there is a set Y such that $X = \text{Free}(Y)$. The minimal set Y with this property is called *obstacle* and will be denoted $\text{Forb}(X)$. If $\text{Forb}(X)$ is finite, we call X a *finitely defined* class.

Given a graph $G = (V, E)$ and a subset of vertices $U \subseteq V$, we denote by $G - U$ the subgraph of G induced by $V - U$. The set of vertices adjacent to a vertex $v \in V$ is denoted $N(v)$ and is called the neighborhood of v . The degree of v is $d(v)$. As usual, C_n is the chordless cycle and K_n is the complete graph on n vertices. Also, $2K_2$ is the disjoint union of two copies of K_2 , and $K_n - e$ is the graph obtained from K_n by deleting a single edge. $K_{n,m}$ stands for the complete bipartite graph with parts of the size n and m . By H_i we denote the graph in Fig. 1(a).

Throughout the paper we use special notations for two particular classes of graphs:

CONTENTS
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