

Preface

Research in Graph Theory and Algorithms on Graphs has been increasing in the last decade. In particular, the study of problems related to cliques in graphs has been one of the most trending topics. This volume contains some of the works presented in the 8th Latin-American Workshop on Cliques in Graphs - LAWCG 2018, which was held at the Federal Center of Technological Education of Rio de Janeiro (CEFET/RJ) and the State University of Rio de Janeiro (UERJ), in Rio de Janeiro, Brazil, on August 9-11, 2018.

The Latin American Workshop on Cliques in Graphs is becoming a traditional workshop on Graph Theory. Previous workshops have been organized in each of the following countries: Brazil (2002), Argentina (2006), Mexico (2008), Brazil (2010), Argentina (2012), Brazil (2014), and Argentina (2016). In its origins, the workshop was meant to foster interaction between the Latin-American graph theory and combinatorics researchers, whose interests include cliques, clique graphs, the behavior of the clique operator, and related issues. In these sixteen years, the community has grown and the workshop has become not only a place for exchanging ideas on cliques, but a moment to strengthen the relationships between its community members as well as to start new relations.

The LAWCG 2018 was a scientific event supported by the Special Committee on Algorithms, Combinatorics and Optimization (CE-ACO) of the Brazilian Computer Society (SBC). It was a satellite event of ICM 2018 (International Congress of Mathematicians), that was held in Rio de Janeiro, from August 1st to 9th, 2018. Also in the 2018 edition, the LAWCG joined the commemorations of the 50th edition of the Brazilian Operational Research Symposium (SBPO), organized by the Brazilian Society of Operational Research (SOBRAPO), which is part of the Association of Latin-Iberoamerican Operational Research Societies (ALIO) and the International Federation of Operational Research Societies (IFORS).

Besides Latin America, in this edition, there were special invited speakers from Hungary and from Canada and Slovenia, and also contributions in partnership with researchers from France, USA, Norway, Switzerland and, Australia. There were 4 plenary conferences, 80 contributed talks and the presence of more than 130 researchers and students. Some of these works gave rise to papers that have been included in this volume.

We are grateful to the members of the Steering and Program Committees and especially to the members of the Organizing Committee, who have worked hard in carrying out the many tasks necessary for successfully holding this meeting. We also thank the invited speakers for their enthusiastic participation, and all the authors for their valuable contributions. Thanks are also due to the anonymous referees for their prompt and thorough work.

We thank the financial support given by the company PSR, and the Brazilian Agencies *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (CNPq), *Coordenação de*

Aperfeiçoamento de Pessoal de Nível Superior (CAPES), and Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ).

We also had some cultural activities. Amongst those a show of *chorinho*, which is a genre of Brazilian popular music, and a special dinner at Rio Scenarium, the most famous samba house of Rio de Janeiro city. These activities relaxed the participants and provided social interaction. More details about the conference can be checked on our official website <http://lawcg2018.icomp.ufam.edu.br/>.

Finally, we would like to thank the Editor-in-Chief of *Matemática Contemporânea*, Paulo Cordaro, for opening this important forum to the participants of this Latin-American Workshop.

Celina H. de Figueiredo
Cláudia Linhares Sales
Rosiane de Freitas
Ana Karolinnna Maia
Raphael Machado
Márcia R. Cappelle

Works presented at LAWCG 2018

Plenary Talks

- Clique Operators in Digraphs.
Marisa Gutierrez, Argentina
Universidad Nacional de La Plata
- New results on intersecting families of subsets.
Gyula O. H. Katona, Hungary
Hungarian Academy of Sciences
- Minimizing the Solid Angle Sum of Orthogonal Polyhedra and Edge Guarding.
Jorge Urrutia, Mexico
Universidad Nacional Autónoma de México
- On the genus of dense graphs.
Bojan Mohar, Canada and Slovenia
Simon Fraser University and University of Ljubljana

Contributed Talks

- The b -continuity of graphs with large girth. A. Ibiapina (UFC, Brazil), A. Silva (UFC, Brazil).
- Powers of Circular-Arc Models. F. J. Soullignac (UNQ/CONICET, Mexico), P. Terlisky (UBA, Argentina).
- A forbidden subgraph characterization of nested and 2-nested graphs. G. A. Durán (UBA/CONICET, Argentina), L. N. Grippo (UNGS, Argentina), N. Pardal (UBA/CONICET, Argentina), M. D. Safe (UNS/CONICET).
- Size Multipartite Ramsey Number. P. H. Perondi (UEM, Brazil), E. L. Monte Carmelo (UEM, Brazil).
- Colorings, Cliques and Relaxations of Planarity. V. Pinciu (SCSU, United States).
- On Gallai and anti-Gallai chordal graphs. G. A. Durán (UBA/CONICET, Argentina), F. Fernández Slezak (UBA, Argentina), L. N. Grippo (UNGS, Argentina), F. S. Oliveira (IME, Brazil), M. D. Safe (UNS/CONICET, Argentina).
- Digrafo de intersección de torneos transitivos maximales. G. Sánchez Vallduví (CONICET), M. Gutiérrez (UNLP, Argentina), B. Llano (UAM-I, Mexico).
- On the Minimum Broadcast Time Problem. D. D. Donne (UNGS, Argentina), I. Koch (UNGS, Argentina).

- Algoritmos para os Casos Polinomiais da Coloração Orientada. M. P. Ferreira (UFG, Brazil), H. Coelho (UFG, Brazil).
- Equitable total coloring of classes of tripartite complete graphs. A. G. da Silva (PUC, Brazil), D. Sasaki (UERJ, Brazil), S. Dantas (UFF, Brazil).
- Arc-disjoint branching flows. A. K. Maia (UFC, Brazil), J. Costa (UFC, Brazil), R. Lopes (UFC, Brazil).
- B_1 -EPG-Helly Graph Recognition. C. Bornstein (UFRJ, Brazil), T. Santos (UFT, Brazil), U. S. Souza (UFF, Brazil), J. L. Szwarcfiter (UFRJ/UERJ, Brazil).
- A linear algorithm to find the distance in Cayley Graph $H_{l,p}$. C. S. R. Patrão (UFRJ/IFG, Brazil), D. Castonguay (UFG, Brazil), A. C. Ribeiro (IFG, Brazil), L. A. B. Kowada (UFF, Brazil).
- Characterizing Star Graphs. G. C. M. Gomes (UFMG, Brazil), C. V. G. C. Lima (UFMG, Brazil), V. F. dos Santos (UFMG, Brazil).
- Pursuit Games on graphs with few P_4 's. N. Martins (UVA, Brazil), R. Sampaio (UFC, Brazil).
- New results on dually-CPT graphs. L. Alcón (CONICET/UNLP, Argentina), N. Gudiño (CONICET/UNLP, Argentina), M. Gutierrez (CONICET/UNLP, Argentina).
- Knot-Free Vertex Deletion Problem: Parameterized Complexity of a Deadlock Resolution Graph Problem. A. D. A. Carneiro (UFF, Brazil), F. Protti (UFF, Brazil), U. S. Souza (UFF, Brazil).
- A Parameterized Complexity Analysis of Clique and Independent Set in Complementary Prisms. P. Camargo (UFF, Brazil), A. D. A. Carneiro (UFF, Brazil), U. S. Souza (UFF, Brazil).
- A Decomposition for Edge-colouring. J. P. W. Bernardi (UFFS/UFPR, Brazil), S. M. de Almeida (UTFPR, Brazil), L. M. Zatesko (UFFS/UFPR, Brazil).
- Critical ideals of graphs and applications. C. A. Alfaro (Banco de México, Mexico), J. C. H. Lin (UVic, Canada).
- Determinant families of dually chordal graphs. P. De Caria (CONICET/UNLP, Argentina).
- The Diverse Vertex Covers Problem. J. Baste (Sorbonne/CNRS/LIP6, France), M. R. Fellows (UiB, Norway), L. Jaffke (UiB, Norway), M. de O. Oliveira (UiB, Norway), F. A. Rosamond (UiB, Norway).
- Extremal unit circular-arc models. F. J. Soulignac (UNQ/CONICET/UBA, Argentina), P. Terlisky (CONICET/UBA, Argentina).

- Characterization by forbidden subgraphs of near-bipartite P_4 -tidy graphs. F. Silva (UFF, Brazil), R. Bravo (UFF, Brazil), R. Oliveira (UFF, Brazil), U. S. Souza (UFF, Brazil).
- Circular-arc Bigraphs and the Helly subclass. M. Groshaus (CONICET/UBA, Argentina), A. L. P. Guedes (UFPR, Brazil), F. S. Kolberg (UFPR, Brazil).
- Graphs with small fall-spectrum. A. Silva (UFC, Brazil).
- Some Spectral Properties of Fulleroids-(3, 4, 6). C. M. da Silva Jr. (CEFET-RJ, Brazil), D. S. Nicodemos (Colégio Pedro II, Brazil).
- Characterizing General Fullerene Graphs. S. Dantas (UFF, Brazil), L. Faria (UERJ, Brazil), A. Furtado (CEFET-RJ, Brazil), S. Klein (UFRJ, Brazil), D. S. Nicodemos (Colégio Pedro II, Brazil).
- On bicliques and the second clique graph of suspensions. M. A. Pizaña (UAM, Mexico), I. A. Robles (UAM, Mexico).
- On the convexity number for complementary prisms. D. Castonguay (UFG, Brazil), E. M. M. Coelho (UFG, Brazil), H. Coelho (UFG, Brazil), J. R. Nascimento (UFG, Brazil).
- The Biclique Graph of K_3 -free Graphs are the Square of Some Graph. M. Groshaus (CONICET/UBA, Argentina), A. L. P. Guedes (UFPR, Brazil).
- On distance colorings, graph embedding and IP/CP models. R. de Freitas (UFAM, Brazil), B. Dias (UFAM, Brazil), N. Maculan (UFRJ, Brazil), J. Marrenco (UNGS, Argentina), P. Michelon (UAPV, France), J. L. Szwarcfiter (UFRJ, Brazil).
- On the adjacent vertex-distinguishing total coloring of power of cycles. J. D. Alvarado (UFF, Brazil), S. Dantas (UFF, Brazil).
- On the Diameter of Spherical Fullerene Graphs. S. Dantas (UFF, Brazil), V. Linder (UFF, Brazil), D. S. Nicodemos (Colégio Pedro II, Brazil).
- Clobber game as executive functions test. T. Pará (UFRJ/FAETEC-RJ, Brazil), S. Dantas (UFF, Brazil), S. Gravier (CNRS/UGA, France), L. A. V. de Carvalho (UFRJ, Brazil), P. Mattos (UFRJ, Brazil).
- Coloring Game: characterization of a $(3, 4^*)$ -caterpillar. S. Dantas (UFF, Brazil), C. M. H. de Figueiredo (UFRJ, Brazil), A. Furtado (CEFET-RJ, Brazil), S. Gravier (CNRS/UGA, France).
- Identifying codes in complementary prisms. J. P. Félix (UFG, Brazil), M. R. Cappelle (UFG, Brazil)
- On identifying codes in the Cartesian product of a star and a path. J. P. Félix (UFG, Brazil), M. R. Cappelle (UFG, Brazil).
- A pseudo-polynomial algorithm for the two-dimensional guillotine cutting stock. U. S. Souza (UFF, Brazil), L. Perazzini (UFF, Brazil), P. H. González (CEFET-RJ, Brazil).

- Directed tree-width is FPT. A. K. Maia (UFC, Brazil), R. Lopes (UFC, Brazil), V. Campos (UFC, Brazil).
- On a Class of Proper 2-Thin Graphs M. S. Sampaio Jr. (UFRJ, Brazil), F. S. Oliveira (UERJ, Brazil), J. L. Szwarcfiter (UFRJ/UERJ, Brazil).
- Tessellations on graphs with few P_4 's. A. Abreu (UFRJ, Brazil), F. Marquezino (UFRJ, Brazil), D. Posner (UFRJ, Brazil).
- Determining optimum tree t -spanners for split graphs and cographs. F. Couto (UFRRJ, Brazil), L. F. Cunha (UFRJ, Brazil), D Ferraz (UFRRJ, Brazil).
- On Orthodox Tree Representations of $K_{n,m}$. C. F. Bornstein (UFRJ, Brazil), J. W. Coura Pinto (FETRJ, Brazil), J. L. Szwarcfiter (UFRJ/UERJ, Brazil).
- A strategy to select vertices as candidates for routers in a Steiner tree. J. G. Martinez (UFAM, Brazil), R. de Freitas (UFAM, Brazil), A. da Silva (UFAM, Brazil), F. Protti (UFF, Brazil).
- Covering a body using unequal spheres and the problem of finding covering holes. H. M. Venceslau (CEFET/RJ, Brazil), M. B. K. Venceslau (CPII-RJ, Brazil), N. Maculan (UFRJ, Brazil).
- The Colourability problem on (r,l) -Graphs and a few parametrized solutions. M. S. D. Alves (UFF, Brazil), U. S. Souza (UFF, Brazil).
- Biclique Graphs of Interval Bigraphs and Circular-arc Bigraphs. E. P. Cruz (UFPR, Brazil), M. Groshaus (CONICET/UBA, Argentina), A. L. P. Guedes (UFPR, Brazil).
- The unit-demand envy-free pricing problem applied to the sports entertainment industry. M. Salvatierra (UFAM, Brazil), R. de Freitas (UFAM, Brazil).
- The Terminal connection problem on strongly chordal graphs and cographs. A. A. Melo (UFRJ, Brazil), C. M. H. de Figueiredo (UFRJ, Brazil), U. S. Souza (UFF, Brazil).
- An optimal algorithm to totally color some power of cycle graphs. A. Zorzi (UFRJ, Brazil), C. M. H. de Figueiredo (UFRJ, Brazil), Raphael Machado (CEFET-RJ, Brazil).
- P_3 -Helly number of graphs with few P_4 . M. T. Carvalho (UFF, Brazil), S. Dantas (UFF, Brazil), M. C. Dourado (UFRJ, Brazil), D. Posner (UFRJ, Brazil), J. L. Szwarcfiter (UFRJ, Brazil).
- Matching problem for vertex colored graphs. M. Matamala (Universidad de Chile, Chile).
- Complexity Analysis of the And/Or graph Solution Problem on Planar Graphs. M. R. Alves (UFF, Brazil), U. S. Souza (UFF, Brazil).
- Sobre los grafos PVPG: una subclase de los grafos vértice intersección de caminos en una grilla. L. Alcón (UNLP, Argentina), F. Bonomo (UBA, Argentina), M. P. Mazzoleni (UNLP, Argentina), F. Oliveira (UERJ, Brazil).

- A kernelization algorithm for Closest String parameterized by the number of input strings. M. B. Stockinger (UFF, Brazil), U. S. Souza (UFF, Brazil).
- Sobre Códigos Corretores de Distância Hamming 3. N. Pedroza (UFRJ, Brazil), P. E. Pinto (UERJ, Brazil), J. L. Szwarcfiter (UFRJ/UERJ, Brazil).
- Clique-divergence is not first-order expressible for the class of finite graphs. C. Cedillo (UAMA, Mexico), M. A. Pizaña (UAM, Mexico).
- Equitable total coloring of graphs with universal vertex. M. M. Omai (UTFPR, Brazil), S. M. de Almeida (UERJ, Brazil), D. Sasaki (UERJ, Brazil).
- On the P_3 -Hull Number for Strongly Regular Graphs. E. M. M. Coelho (UFG, Brazil), B. R. Silva (UFG, Brazil), H. Coelho (UFG, Brazil).
- Maximum number of edges in graphs with prescribed maximum degree and matching number. P. Heggernes (UiB, Norway), J. R. S. Blair (USMA, USA), P. T. Lima (UiB, Norway).
- New proposals for the Problem of Covering Solids using Spheres of Different Radii. P. H. González (CEFET-RJ, Brazil), A. F. U. S. Macambira (UFPB, Brazil), R. V. Pinto (UFRRJ, Brazil), L. Simonetti (UFRJ, Brazil), N. Maculan (UFRJ, Brazil), P. Michelon (UAPV, France).
- On Clique-Inverse Graphs of Graphs with Bounded Clique Number. L. Alcón (UNLP/CONICET, Argentina), S. Gravier (UGA, France), C. L. Sales (UFC, Brazil), F. Protti (UFF, Brazil), G. Ravenna (UNLP/CONICET, Argentina).
- Sobre o número de Sierksma de um grafo. F. P. do Carmo (UFF/IFF, Brazil), C. A. de J. Marthinon (UFF, Brazil), U. S. Souza (UFF, Brazil), M. T. Carvalho Junior (Instituto Benjamin Constant, Brazil).
- Prismas complementares com 2-atribuição de papéis. D. Castonguay (UFG, Brazil), E. S. Dias (UFG, Brazil), F. N. Mesquita (UFG, Brazil).
- An extremal problem on the interval counts. L. S. Medeiros (UERJ, Brazil), F. S. Oliveira (UERJ, Brazil), J. L. Szwarcfiter (UERJ/UFRJ, Brazil).
- Worst cases in constrained LIFO pick-up and delivery problems. S. Urrutia (UFMG, Brazil), D. de Werra (EPFL, Switzerland).
- Some forbidden structures for the near-bipartition problem on distance-hereditary graphs. R. Oliveira (UFF, Brazil), R. Bravo (UFF, Brazil), U. S. Souza (UFF, Brazil), F. Silva (UFF, Brazil).
- Vector Domination Problem on the family of Split-Indifference Graphs. R. L. Mafort (UFF, Brazil), F. Protti (UFF, Brazil).

- Caracterização estrutural de grafos-(1, 2) bem-cobertos. S. R. Alves (FAETEC/RJ, Brazil), F. Couto (UFRRJ, Brazil), L. Faria (UERJ, Brazil), S. Gravier (IF-UGA, France), S. Klein (UFRJ, Brazil), U. S. Souza (UFF, Brazil).
- The Rank on the Graph Geodetic Convexity. M. T. Carvalho Junior(UFF, Brazil), S. Dantas (UFF, Brazil), C. V. G. C. Lima (UFMG, Brazil), V. Linder (UFF, Brazil), V. F. dos Santos (UFMG, Brazil).
- Alguns Resultados em Coloração Orientada e Clique Coloração Orientada. H. Coelho (UFG, Brazil), L. Faria (UERJ, Brazil), S. Gravier (IF-UGA, France), S. Klein (UFRJ, Brazil).
- Some spectral properties of spider graphs. R. R. Del-Vecchio (UFF, Brazil), L. L. S. Portugal (UFF, Brazil), C. M. da Silva Jr. (CEFET/RJ, Brazil).
- The Zero-Divisor Graphs of the Direct Product of Commutative Rings. A. E. Brondani (UFF, Brazil), F. A. M. França (UFF, Brazil), D. F. Traciná Filho (UFF, Brazil).
- Proper gap-labellings of unicyclic graphs. C. A. Weffort-Santos (UNICAMP, Brazil), C. N. Campos (UNICAMP, Brazil), R. C. S. Schouery (UNICAMP, Brazil).
- A Recolouring Procedure for Total Colouring. L. M. Zatesko (UFFS/UFPR, Brazil), R. Carmo (UFPR, Brazil), A. L. P. Guedes (UFPR, Brazil).
- Weighted proper orientations of trees and graphs of bounded treewidth. J. Araujo (UFC, Brazil), C. L. Sales (UFC, Brazil), I. Sau (CNRS/UM, France), A. Silva (UFC, Brazil).
- Connectivity of cubical polytopes. H. B. Thi (FUA, Australia), G. Pineda-Villavicencio (FUA, Australia), J. Ugon (DU, Australia).
- On the null structure of bipartite graphs without cycles of length multiple of 4. D. A. Jaime (UNSL, Argentina), G. Molina (UNSL, Argentina), A. Pastine (UNSL, Argentina).
- Pebbling in Semi-2-Trees. L. Alcón (UNLP, Argentina), M. Gutierrez (UNLP, Argentina), G. Hurlbert (VCU, United States).