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Editorial

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This special issue contains the journal versions of a selection of papers from the 10th Latin American Symposium on Theoretical Informatics (LATIN), held April 16–20, 2012 on the campus of Universidad Católica San Pablo, in Arequipa, Peru. The conference covered a broad range of topics in theoretical computer science, including algorithms, automata theory and formal languages, coding theory and data compression, combinatorics and graph theory, complexity theory, computational geometry, data structures, Internet and the web, logic in computer science, mathematical programming, parallel and distributed computing, pattern matching, and random structures. Nine papers were selected for this special issue, all of which went through the thorough reviewing process that is the standard for Algorithmica. The selection was based on two criteria: the quality of the manuscripts and the desire to give readers a sense of the breadth and depth of the topics covered by LATIN. The overview that follows underscores these points.

In *A Generalization of the convex Kakeya problem*, Ahn, Bae, Cheong, Gudmundsson,Tokuyama, and Vigneron answer an intriguing geometrical question: given a set of line segments in the plane, what is a convex region of smallest area that contains a translate of each input segment? They show that there is always an optimal region that is a triangle, and give an optimal algorithm to compute such a triangle.

In the renaming problem, each process in a distributed system is issued a unique name from a large namespace. The processes must then coordinate to choose unique names from a much smaller namespace. In *An equivariance theorem with applications to renaming*, Castañeda, Herlihy, and Rajsbaum use techniques from algebraic topology to prove the non-existence of renaming algorithms in several models of computation.

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Suppose we are given a graph and two disjoint subsets of its vertices, called terminals. The 2-disjoint connected subgraphs problem asks if there exist two vertex-disjoint connected subgraphs, such that each subgraph contains only one of the two sets of terminals. Until now, it was an open question whether one can improve upon the naïve algorithm for this NP-complete problem. As Cygan, Pilipczuk, Pilipczuk, and Wojtaszczyk show in *Solving the 2-Disjoint Connected Subgraphs problem faster than* 2^n, the answer is "yes".

The integer programming problem—one of the fundamental problems in combinatorial optimization—asks whether an n-dimensional polytope contains an integer point. In *A randomized sieving algorithm for approximate integer programming*, Dadush takes a step towards settling a major open question: can Integer Programming can be solved in $2^{O(n)}$ time? He gives a randomized a algorithm for the problem whose running times can be made arbitrarily close to $2^{O(n)}$. When the algorithm returns "yes", this answer is guaranteed to be correct. Otherwise, the algorithm returns a slightly dilated version of the input polytope that is integer-free with high probability.

The problem of detecting patterns in graphs has been studied from several perspectives. In *Computing H-joins with application to 2-modular decomposition*, Habib, Mamcarz, and de Montgolfier consider the following approach. Suppose H is a bipartite graph — the pattern graph. A graph G admits an H-join, if its vertices can be partitioned into parts connected as in H. Habib et al. present a general framework to compute H-joins, which yields the fastest known algorithms for several pattern graphs.

In the hiring problem, a manager interviews a succession of job candidates. Immediately after each interview, the manager must decide whether or not to hire the candidate. In *Analysis of the strategy Hiring above the m-th best candidate*, Helmi, Martínez, and Panholzer offer a thorough probabilistic analysis of properties of the following strategy. Hire the first m interviewees, regardless of their ranks (it is assumed that candidates can be ranked from worst to best without ties); each of the remaining candidates is hired if his or her relative rank is better than that of the m-th best candidate seen so far.

The elegant structure of circulant graphs makes them a promising class of topologies for computer networks. In *Random walks, bisections and gossiping in circulant graphs*, Mans and Shparlinski prove a number of combinatorial and algorithmic results for random regular circulant graphs. These include the properties of walks, the existence of algorithms to find vertex and edge bisectors, and the number of rounds needed by a distributed algorithm for gossiping — i.e., for disseminating information from each node in the network to all the others.

The feedback arc set problem is among the original 21 problems that Karp proved to be NP-complete in his seminal paper. The problem has gained attention in recent years in the context of rank aggregation, the task of reconciling different, inconsistent, preferences. In *The feedback arc set problem with triangle inequality is a vertex cover problem*, Mastrolilli shows a surprising connection between feedback arc sets and minimum vertex covers in hypergraphs.

In *Degree-constrained node-connectivity problems*, Nutov studies questions of the following form. Given an edge-weighted graph, find a minimum-cost subgraph satisfying certain connectivity requirements, whose node degrees are within some prescribed bounds. Nutov describes a framework that leads to polynomial-time algorithms that return subgraphs whose cost is within a small factor from optimality, and where the node degrees are not too far from the specified bounds.

I trust that the quality and diversity of these papers will ensure that any reader interested in theoretical computer science will find something appealing in this special issue. Assembling this collection was a collaborative effort. I thank the authors for accepting my invitation, the referees for their careful reviews, and Ming-Yang Kao — the editor-in-chief of Algorithmica — for giving me the opportunity to edit this special issue.

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