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Foreword: Special Issue on Theory and Applications of Graph Searching Problems

In a Graph Searching Game, one part is a set of escaping mobile entities, called evaders (or fugitives), that hide in a graph representing a network, and the other part is a number of chasing agents, called searchers (or pursuers), that move systematically in the graph. The game may vary significantly according to the capabilities of the evaders and the pursuers in terms of relative speed, sensor capabilities, visibility, etc. The objective of the game is to capture the evaders in an optimal way, where the notion of optimality itself admits varying interpretations. Alternatively, such games are known as *pursuit-evasion games* or *cops and robbers games*.

Graph searching revealed the need to express in a formal mathematical way intuitive concepts such as avoidance, surrounding, sense of direction, hiding, persecution, threatening, collaboration, and coalition. There are many variants of graph searching studied in the literature, which are either application driven, i.e. motivated by problems in practice, or are inspired by foundational issues in Computer Science, Discrete Mathematics, and Artificial Intelligence. They are related to diverse topics such as Information Seeking, Robot motion planning, Database Theory, Logic, Distributed Computing, Models of computation, and Network security.

The workshop series *GRASTA*, *GRAph Searching, Theory and Applications* was established as the main forum on the area of Graph Searching and gathers the widest possible variety of related disciplines. It has already held in Anogia, Crete, Greece (2006), Praia de Redonda, Ceara, Brazil (2008), and Valtice chateau, Valtice, Czech Republic (2009).

This volume is a follow up of the fourth event of the series, namely, the *4th Workshop on GRAph Searching, Theory and Applications* (GRASTA 2011) that took place during Dagstuhl Seminar 11071, from February 13, 2011 to February 18, 2012. While most of the submissions came from the participants of the workshop, there were also many from other contributors. There were, 19 submissions in total. All papers have been carefully reviewed according to the highest standards of Theoretical Computer Science and, among them, 11 have finally been accepted. The material appearing in this issue comprises a wide variety of topics including, Parity games, (hyper)Graph parameters, Graph exploration, Online algorithms, Competitive analysis, Sensor networks, Cleaning games, Chip firing problems, and Random walks.

Finally, we are in the happy position to dedicate this issue to the 60th birthday of Professor Lefteris M. Kirousis. His insight and early vision on Graph Searching has been a source of inspiration for many of us!

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