
Preface

Tiziana Calamoneri

Computer Science Department,
University of Rome 'La Sapienza'
via Salaria 113 – 00198, Rome, Italy
E-mail: calamo@di.uniroma1.it

Biographical notes: Tiziana Calamoneri is an Assistant Professor at the Department of Computer Science, University of Rome 'La Sapienza'. She got her PhD in Computer Science 1997, at University of Rome 'La Sapienza', Italy. Her research interests include parallel and sequential graph algorithms, channel assignment in wireless networks, two- and three-dimensional graph drawing, layout of interconnection networks topologies and optimal routing schemes.

1 Introduction

The first six papers in this issue of *IJMNDI* are especially devoted to the first workshop on frequency assignment problems, held in Certosa di Pontignano (Siena), Italy on 14 and 15 October 2005.

The class of frequency assignment problems is a widely studied research area. The task is to assign radio frequencies to transmitters in wireless networks without causing interference, but depending on the particular network, the understanding of frequency assignment and of interference varies.

The interest in this class of problems has grown up in the last decade, because of the rapid development of new wireless services. Like with all scarcely available resources, the cost of frequency-use provides the need for economic use of the available frequencies. Reuse of frequencies within a wireless communication network can offer considerable economies. However, reuse of frequencies may also lead to a loss of quality of communication links. The use of (almost) the same frequency for multiple wireless connections can cause interference between the signals that is unacceptable. The frequency assignment problem balances the economies of reuse of frequencies and the loss of quality in the network.

There is considerable literature devoted to the study of the frequency assignment problems, following many different approaches, including graph theory and combinatorics, simulated annealing, genetic algorithms, tabu search and neural networks.

The workshops on Frequency Assignment Problems were intended to cover contributions in all these areas.

In particular, they have aimed at bringing together scientists, engineers and practitioners of the field in order to have a forum for sharing and exchanging their experiences, for discussing fundamental challenges, reporting state-of-the-art and in-progress research, identifying future perspectives and exchanging ideas about ongoing research to keep up with the rapid evolution and increasing complexity of such systems.

The first edition of the Workshop – held in October 2005 – succeeded in this goal: researchers from different areas met together and had interesting discussions. The covered areas were mainly operations research, graph algorithms, complexity theory, genetic algorithms and game theory.

The six papers accepted for this Special Issue cover most of these fields: one of them presents some approximating results 'Approximating the $L(h, k)$ -labelling problem', one is based on game theory 'Game theoretic and coordinated interference-based channel allocation schemes for packet mobile communication system', one shows a genetic algorithm 'A genetic algorithm for frequency assignment with problem decomposition', three are more graph theory-oriented and deal with some bounds on the span of two special frequency assignment problems 'New bounds for the $L(h, k)$ -number of regular grids', 'Optimal frequency assignments of cycles and powers of cycles' and 'Bounds for the $L(d, 1)$ -number of diameter 2 graphs, trees and Cacti'.

I hope this is the first step towards a working philosophy based on cooperation and exchange of information, techniques and approaches among the frequency assignment communities.