

Preface

The First International Conference on Algorithmic Applications in Management (recently changed to International Conference on Algorithmic Aspects in Information and Management, abbreviated as AAIM 2005) was held June 22–25, 2005 in Xi'an, China. Some of the best papers were invited to be published in this special issue of *Theoretical Computer Science*. The five selected papers are from computational financing, scheduling, graph theory, computational complexity and facility location.

The first paper is “Computation of arbitrage in frictional bond markets” by Mao-cheng Cai, Xiaotie Deng and Zhongfei Li. The authors studied the computational problem of arbitrage in a frictional market with a finite number of bonds and finite and discrete times to maturity. A necessary and sufficient condition for the existence of arbitrage is obtained and the general problem is shown to be NP-complete.

The second paper “Improved algorithms for two single machine scheduling problems” by Yong He, Weiya Zhong and Huikun Gu, focuses on improving approximations for two single machine scheduling problems, which are both NP-complete. For one version of the problem, they improved the best approximation ratio of $\frac{5}{3}$ to $\frac{53}{35}$, which is almost tight; for the other version they improved upon the best factor- $(\frac{20}{17})$ approximation by presenting a PTAS.

In the third paper “Graph bandwidth of weighted caterpillars”, Mingen Lin, Zhiyong Lin and Jinhui Xu studied the bandwidth minimization problem of weighted caterpillars and showed that even some restricted versions are NP-complete. They also presented several exact and approximation algorithms for these problems.

In the fourth paper “On product covering in 3-tier supply chain models: natural complete problems for W[3] and W[4]”, Jianer Chen and Fenghui Zhang presented first natural complete problems for the classes W[3] and W[4], which was unknown prior to this work. The result also shows the difficulty in solving some problems in the research of supply chain management.

In the fifth paper “Approximation algorithms for facility location problems with a special class of subadditive cost functions”, Gabor and van Ommeren presented a factor- $(2 + \varepsilon)$ approximation for facility location problems with subadditive costs. Typical problems of this kind include facility location problems with stochastic demand and exponential servers.

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