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Preface

The Fifth International Conference on Decision Support for Telecommunications and Information Society DSTIS-2005, organized by the National Institute of Telecommunications in Warsaw (1st – 2nd September, 2005), was an opportunity to bring together researchers working on optimization and decision support for telecommunications industry and information society.

The first paper presents a reflection on the role of technology and, in particular, information technology in the era of knowledge civilization. Diverse perceptions of this era, the concepts of three civilization eras versus three waves, of a cultural platform versus an episteme of a civilization era, of a big change at the end of industrial civilization era are outlined.

The next two papers are devoted to network planning. The first paper presents a variable neighborhood search (VNS) metaheuristic that is applied to solve the provisioning and routing problem in WDM networks. An integer flow formulation is modeled in AMPL and solved by CPLEX in order to obtain optimal solutions as a reference for the heuristic. The second paper shows how the concepts of multiple criteria equitable optimization can be effectively used to generate various fair and efficient allocation schemes. The authors introduce a multiple criteria model equivalent to equitable optimization and they develop a corresponding reference point procedure for fair and efficient network dimensioning for elastic flows. The procedure was tested on a sample network dimensioning problem for elastic traffic and its abilities to model various preferences are demonstrated.

In various types telecommunication networks, namely mobile ad hoc networks, WDM networks and MPLS networks, there is the necessity of calculating disjoint paths for given node to node connections in order to increase the reliability of the services supported by these networks. This leads to the problem of calculating a pair of disjoint paths (or a set of disjoint paths) which optimises some measure of performance in those networks. In the next paper an algorithm, designated as OptDP, for obtaining the most reliable pair of disjoint paths based on the loopless version of MPS, a very efficient k-shortest path algorithm, and on Dijkstra algorithm is presented. In the next elaboration the authors propose some extensions of the minimum labelling spanning tree problem. The main focus is on the minimum labelling Steiner tree problem: given a graph G with a color (label) assigned to each edge, and a subset Q of the nodes of G (basic vertices), we look for a connected subgraph of G with the minimum number of different colors covering all the basic vertices. The problem has several applications in telecommunication networks.

We have included the paper that reviews current algorithms for distributed, asynchronous control of networks when the customer is guaranteed to get some predetermined (e.g., as a part of a service level agreement – SLA) values of flow. Two cases are considered – both with single and multiple commodity. It is assumed, that the flow cost functions are convex with special attention devoted to linear and strictly convex cases.

In designing and analysis of telecommunication networks important role have various type of simulators. The paper presented in this volume addresses issues associated with the application of federations of parallel/distributed simulators to large scale networks simulation. Two principal paradigms for constructing simulations today are discussed. Particular attention is paid to an approach for federating parallel/distributed simulators. The authors describe the design and performance of frame relay network simulator (FR/ASimJava) implemented based on a Java-based library for distributed simulation – ASimJava.

The last five papers are focusing on data analysis and advanced systems. In the first paper the authors are interested in the question of coherence of radial implicative fuzzy systems with nominal consequents. Implicative fuzzy systems are fuzzy systems employing residuated fuzzy implications for representation of IF-THEN structure of their rules. Radial fuzzy systems are fuzzy systems exhibiting the radial property in antecedents of their rules. The property simplifies computational model of radial systems and makes the investigation of their properties more tractable.

In four Maghreb countries a considerable improvement of the situation of the telecommunication operators has been noticed during the nineties. The evolution in these countries was very different depending on their economic policies, their effort of reorganization of their telecommunication sector and their technological change. Theses differences were analysed by comparing the operators' performances over a decade (1992–2001) by using the Malmquist DEA TFP index for measuring the total factors productivity change, decomposed into technical efficiency change and technological changes and by using the Promethee II method.

Today many different software tools for decision support exist; the same is true for data mining which can be seen as a particularly challenging sub-area of decision support. Choosing the most suitable tool for a particular industrial data mining application is becoming difficult, especially for industrial decision makers whose expertise is in a different field. The next contribution provides a conceptual analysis of crucial features of current data mining software tools, by establishing an abstract view on typical processes in data mining. Thus a common terminology is given which simplifies the comparison of tools. Based on this analysis, objective decisions for the application of decision supporting software tools in industrial practice can be made.

The next paper describes a framework for modeling and management of complex systems. There are various approaches for modeling of these systems. One of the approaches is events driven modeling and management of complex system. Such approach is needed in information systems that provide information in real-time. Most of the existing modeling approaches use only information about type of event and the time when an event occurs. However, in the databases we can store and then we can use much richer information about events. This information might be structured as well as unstructured. There are new challenges in algorithms development in case of description of event by various attributes.

The last paper is not directly related to telecommunications. However, the developed method might be applied also in telecommunications industry. Stochastic version of DEMATEL was developed as a revised DEMATEL (Decision Making Trial and Evaluation Laboratory) to extract structural models of a complex problems composed of many factors under uncertainty.

Janusz Granat
Guest Editor