PREFACE

This volume of *Zbornik Radova* is dedicated to the memory of Professor Nenad Mladenović who left an exceptional legacy in the field of operations research. The main Mladenović's research contribution is the creation of the Variable Neighborhood Search (VNS) methodology, which nowadays has the status of one of the leading general heuristic methods. The authors represented in the volume have been invited to contribute review papers on the VNS approach to different problems of their expertise. All of them have been long-term collaborators of Nenad Mladenović.

In the introductory paper *In Memory of Nenad Mladenović*, Vera Kovačević-Vujčić summarizes the most important details of Mladenović's biography and scientific achievements, followed by a complete bibliography.

The paper *Recent Advances in Adaptive Variable Neighborhood Search Methods* by Panagiotis Karakostas and Angelo Sifaleras investigates the development and application of adaptive VNS heuristics for solving complex optimization problems. Through a systematic literature review of studies from the past decade, the research aims to identify adaptive mechanisms which have been integrated into VNS methods, the learning strategies employed, and the specific VNS variants enhanced by these adaptations. In their paper *Survey on Variable Neighborhood Search for the Uncapacitated Single Allocation p-Hub Median Problem*, Jack Brimberg, Raca Todosijević and Dragan Urošević review a General Variable Neighborhood Search (GVNS) that has been developed for the Uncapacitated Single Allocation p-Hub Median Problem (USApHMP) which is considered as a cornerstone problem for designing efficient and cost-effective logistics and telecommunications networks. GVNS has been successfully tested on standard benchmark datasets, including AP and URAND instances with up to 1000 nodes, showing the superiority over other state-of-the-art heuristics for solving USApHMP. Tatjana Davidović, Tatjana Jakšić-Krüger and Teodor Gabriel Crainic contributed the paper *A Survey of Parallel Variable Neighborhood Search Strategies*. The main focus of this study is on the comprehensive survey of parallelization strategies for the VNS metaheuristic. The authors strive to derive practical recommendations how to address various optimization problems taking into account both the available multiprocessor architecture and the existing sequential VNS implementation.

Dragan Urosević's paper *Variable Neighborhood Search for Different Variants of Traveling Salesman Problem* provides an overview of different VNS variants and describes how they can be used to solve two variations of the Traveling Salesman

Problem: Pick Up and Delivery TSP and Traveling Deliveryman Problem. Neighborhood structures used for the classical TSP are customized for these problems using new efficient data structures for solution representation, which enables the implementation of highly efficient variants of the VNS. The paper *A Survey on Continuous Variable Neighbourhood Search Based Heuristics* by Zorica Dražić gives an overview of the VNS methodology for global minimization of a continuous function. Both unconstrained and constrained optimization problems are considered. In general case the number of local minima increases exponentially with the dimension of the problem and VNS-based heuristics turn out to be state-of-the-art methods for global optimization. In his paper *Advances in Variable Neighbourhood Search for Graph Clustering* Dušan Džamić summarizes the key results of applying the VNS to graph clustering. The paper also presents experimental findings that demonstrate the robustness and flexibility of the VNS in achieving high-quality cluster partitions on artificial and real-world networks.

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