



## ADMISSION TO DOCTORAL SCHOOL – September 2023

Field of doctoral studies: Computer Science

PhD supervisor: Adrian Marius Deaconu

### Topics for admission to Doctoral School

#### TOPIC 1: *Metaheuristic algorithms used in optimization and their applications*

Content / main aspects to be considered:

- Development, hybridization and adaptation of metaheuristic algorithms for solving practical problems
- Comparison of the results obtained with those from the specialized literature
- Speed-up through parallel programming (CPU and/or GPU)

Bibliografie recomandată:

1. Kanchan Rajwar, Kusum Deep, Swagatam Das, *An exhaustive review of the metaheuristic algorithms for search and optimization: taxonomy, applications, and open challenges*, Artificial Intelligence Review, 2023  
<https://link.springer.com/article/10.1007/s10462-023-10470-y>
2. Daniel T Cotfas, Adrian M Deaconu, Petru A Cotfas, *Application of successive discretization algorithm for determining photovoltaic cells parameters*, Energy conversion and management, vol. 196, pp. 545-556, 2019
3. Deaconu, Adrian M., Cotfas, Daniel T., Cotfas, Petru A., *Calculation of Seven Photovoltaic Cells Parameters Using Parallelized Successive Discretization Algorithm*, vol. 2020, 6669579
4. Mokhtar Essaid, Lhassane Idoumghar, Julien Lepagnot, Mathieu Brévilliers, *GPU parallelization strategies for metaheuristics: a survey*, International Journal of Parallel, Emergent and Distributed Systems, vol. 34, Issue 5, pp. 497-522, 2019

#### TOPIC 2: *New Inverse Network Optimization Problems*

Content / main aspects to be considered:

- Inverse and reverse network optimization problems
- Network expansion optimization problems
- Network interdiction optimization problems
- Time complexity of algorithms: designing polynomial-time algorithms or proving NP-completeness.
- Implementing algorithms and running them on different instances.
- Where possible, speed-up through parallel programming (CPU and/or GPU)

Recommended bibliography:

1. Demange, M., Monnot, J., *An introduction to inverse combinatorial problems*, in Vangelis Th. Paschos, *Paradigms of Combinatorial Optimization (Problems and New Approaches)*; Wiley: London, UK; Hoboken, NJ, USA, 2010
2. Deaconu, A. M., & Tayyebi, J., *Inverse Maximum Capacity Path Problems Under Sum-Type and Max-Type Distances and Their Practical Application to Transportation Networks*, *IEEE Access*, 8, pp. 225957-225966, 2020
3. Tayyebi, J., & Deaconu, A. (2021). *Expanding maximum capacity path under weighted sum-type distances*, *AIMS Mathematics*, 6(4), pp. 3996-4010, 2021
4. Deaconu, A.M., Majercsik, L., *Flow Increment through Network Expansion*, *Mathematics*, vol. 9, 2308, 2021
5. Abdolazadeh, A., Aman, M., & Tayyebi, J., *Minimum st-cut interdiction problem*, *Computers & Industrial Engineering*, vol. 148, 106708, 2020

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Doctoral field coordinator,  
Prof. Dr. Sabin Marius Tăbîrcă