

## Optimization algorithms

**Starting year:** 2018

**Group leader:** Assoc. Prof. Adrian Marius Deaconu

### Group members:

- Prof. Eleonor Ciurea
- Assoc. Prof. Laura Ciupală
- Asist. Corina-Ştefania Nănău
- Asist. Luciana Majercsik
- Asist. Delia Spridon

### Short presentation

The research group entitled "Algorithms used in optimization" started its activity in 2018 at the Faculty of Mathematics and Computer Science, Transilvania University of Braşov, in order to strengthen a team with common scientific research concerns whose ideas can be translated into publications in internationally rated journals (ISI indexed or in other well-known databases), books and, last but not least, to apply for research projects nationally and internationally.

Over the last decades, the amount of information that exists and needs to be processed has grown at an increasingly fast pace. This reality leads to the need to develop methods and algorithms for optimization indispensable for addressing various practical issues in fields such as engineering, physics, economics, finance, biology, construction, medicine, etc. The research team wants to find solutions for a wide range of practical problems in the mentioned fields.

It is also desired to find partners in the economic field in order to identify practical problems that can be modeled and subsequently solved within the team, thus attracting research ideas and funds.

### Recently published articles by the group members (last 10 years):

1. D.T. Cotfas, **A.M. Deaconu**, P.A. Cotfas, *Hybrid successive discretisation algorithm used to calculate parameters of the photovoltaic cells and panels for existing datasets*, IET Renewable Power Generation, 2021
2. **A.M. Deaconu**, **D. Spridon**, *Adaptation of Random Binomial Graphs for Testing Network Flow Problems Algorithms*, Mathematics, 9, 1716, 2021. <https://doi.org/10.3390/math9151716>
3. **A.M. Deaconu**, R. Udriou, C-Ş. Nanau, *Algorithms for Delivery of Data by Drones in an Isolated Area Divided into Squares*, Sensors, 21(16), 5472, 2021. <https://doi.org/10.3390/s21165472>
4. **Deaconu, A.M., Majercsik, L.**, *Flow Increment through Network Expansion*. Mathematics, 9, 2308, 2021. <https://doi.org/10.3390/math9182308>
5. **A.M. Deaconu**, O. Deaconu, *Heuristic and Numerical Geometrical Methods for Estimating the Elevation and Slope at Points Using Level Curves. Application for Embankments.*, Appl. Sci., 11, 6176, 2021. <https://doi.org/10.3390/app11136176>
6. R. Udriou, R., **A.M. Deaconu**, **C.-Ş. Nănău**, *Data Delivery in a Disaster or Quarantined Area Divided into Triangles Using DTN-Based Algorithms for Unmanned Aerial Vehicles*, Sensors, vol. 21, no. 11, 3572, 2021.
7. **L. Ciupală**, **A.M. Deaconu**, *Incremental minimum flow algorithms*, Mathematics, Vol. 9(9), 1025, 2021
8. J. Tayyebi, **A.M. Deaconu**, *Expanding maximum capacity path under weighted sum-type distances*, AIMS Mathematics, Vol. 6, Issue 4, 3996-4000, 2021

9. **L. Ciupală, A. Deaconu, D. Spridon**, *Incremental minimum spanning tree algorithms*, Bulletin of the Transilvania University of Brasov. Mathematics and Computer Science, vol. 14, no. 1, 247-256, 2021
10. **A.M. Deaconu**, J. Tayyebi, *Inverse Maximum Capacity Path Problems under Sum-type and Max-type Distances and their Practical Application to Transportation Networks*, IEEE Access, vol. 8, 225957 – 225966, 2020
11. **A. Deaconu, L. Ciupală**, *Inverse Minimum Cut Problem with Lower and Upper Bounds*, Mathematics, 8 (9), 1494, 2020
12. **C.Ș. Nănău**, *MaxDelivery: a new approach to a DTN Buffer Management*, Proceeding of 21ST IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (IEEE WOWMOM 2020), Cork, Ireland, pp. 60-61, 2020
13. C. Șchiopu, **E. Ciurea**, *Maximum Flows in Planar Dynamic Networks. The Static Approach*, Romanian Journal of Information Science and Technology, Vol. 23, 2020
14. **C.Ș. Nănău**, *Maximum flow in buffer-limited delaytolerant networks. The static approach*, Bulletin of the Transilvania University of Brasov. Mathematics, Informatics, Physics. Series III, vol. 13, no. 1, 2020
15. **L. Ciupală, A. Deaconu, D. Spridon**, *Incremental minimum spanning tree algorithms*, Bulletin of the Transilvania University of Brasov. Mathematics, Informatics, Physics. Series III, vol. 13, no. 1, 343-346, 2020
16. D.T. Cotfas, **A.M. Deaconu**, P. A. Cotfas, *Application of successive discretization algorithm for determining photovoltaic cells parameters*, Energy Conversion and Management, Vol. 196, 545-556, 2019
17. **E. Ciurea**, C. Șchiopu, *Minimum Flows in Directed Planar Dynamic Networks*, 6th International Conference on Control, Decision and Information Technologies (CoDIT), 2019
18. **L. Ciupală, A. Deaconu**, *Minimum cost flow in a network with an overestimated arc capacity*, Bulletin of the Transilvania University of Brasov. Mathematics, Informatics, Physics. Series III, vol. 12, no. 1, 107-112, 2019
19. **L. Ciupală, A. Deaconu**, *Inverse maximum flow problem in planar networks*, Bulletin of the Transilvania University of Brasov, Vol 12 (61), 2019
20. J. Tayyebi, **A. Deaconu**, *Inverse Generalized Maximum Flow Problems*, Mathematics, 7 (10), 899, 2019
21. M. Parpalea, N. Avesalon, **E. Ciurea**, *Minimum parametric flow in time-dependent dynamic networks*, RAIRO - Theoretical Informatics and Applications, Volume 52, No. 1, pp. 43–53, 2018
22. C. Șchiopu, **E. Ciurea**, *Maximum flows in planar dynamic networks with lower bounds*, Fundamenta Informaticae, vol. 163, no. 2, 2018
23. C. Șchiopu, **E. Ciurea**, *Two Flow Problems in Dynamic Networks*, International Journal of Computers, Communications & Control, 12(1): pp. 103-115, 2017
24. N. Avesalon, **E. Ciurea**, M. Parpalea, *The Maximum Parametric Flow in Discrete-time Dynamic Networks*, Fundamenta Informaticae, vol. 156, no. 2, pp. 125-139, 2017
25. C. Șchiopu, **E. Ciurea**, *The maximum flows in planar dynamic networks*, International Journal of Computers Communications & Control, 11(2), pp.282-291, 2016
26. M. Parpalea, **E. Ciurea**, *Minimum parametric flow. A partitioning approach.*, British Journal of Applied Science and Technology, 13(6), 2016
27. **L. Ciupală**, *FIFO preflow algorithm for maximum flow in semi-bipartite networks*, Bulletin of the Transilvania University of Brașov vol. 8(57) no. 1, pp. 117-122, 2015
28. M. Parpalea, **E. Ciurea**, *Partitioning Algorithm for the Parametric Maximum Flow*, Applied Mathematics, Volume 4, No. 10A, pp. 3-10, 2013
29. **E. Ciurea**, M. Parpalea, *Shortest conditional decreasing path algorithm for the parametric minimum flow problem*, Bulletin Mathematique de la Societe de Sciences Mathematique de Roumanie, no. 4, 2013

30. **L. Ciupală**, *A generic preflow algorithm for maximum flow in semi-bipartite networks*, Bulletin of the Transilvania University of Braşov vol. 7(56) no. 1, pp. 103-108, 2013
31. **A. Deaconu, E. Ciurea**, *Inverse feasibility problems of the inverse maximum flow problems*, Sadhana-Academy Proceedings in Engineering Sciences, vol. 38(2), 199-209, 2013
32. **E. Ciurea, M. Parpalea**, *A sequential algorithm for finding the solution of the parametric minimum flow problem*, Carpathian Journal of Mathematics, vol. 28, no. 1, pp.47-58, 2012
33. **A. Deaconu, E. Ciurea**, *The inverse maximum flow problem under  $L_k$  norms*, Carpathian Journal of Mathematics, 59-66, 2012
34. **L. Ciupală**, *Minimum cut with the smallest number of arcs*, Bulletin of the Transilvania University of Braşov vol. 4(53) no. 1, 2011

**Books published by the group members:**

1. G. Moise, E.S. Nicoară, **A.M. Deaconu**, *Grafuri și fluxuri în rețele*, Editura MatrixRom, 2021
2. **A.M. Deaconu**, G. Moise, L.M. Sasu, *Inițiere în Java prin comentarii teoretice și aplicații*, Editura MatrixRom, 2020
3. **E. Ciurea**, *Algoritmica grafurilor*, Editura Universității Transilvania din Braşov, 2008
4. **L. Ciupală**, *Algoritmi fundamentali din teoria grafurilor. Aplicații*, Editura Universității Transilvania, 2007
5. **E. Ciurea, L. Ciupală**, *Algoritmi. Introducere în algoritmica fluxurilor în rețele*, Editura MatrixRom, București, 2006