

# Computational Intelligence Research Group of A. Moshaiov (Feb 2020)

School of Mechanical Engineering & Sagol School of Neuroscience

Tel-Aviv University

(7 Phd students, 2 MSc students, 1 BSc student)

## Multi-objective Optimization: Concept-based Exploration, Concept Selection and Multi-Concept Optimization

1. Moshaiov, A. Tutorial on Multi-concept Optimization, IEEE-SMC 2019 and IEEE-CEC 2018 (also approved for GECCO 2020)  
[https://www.smc2019.org/assets/data/wt\\_rep/SMC2019\\_T2.pdf](https://www.smc2019.org/assets/data/wt_rep/SMC2019_T2.pdf)
2. Farhi, E. and Moshaiov, A. Window-of-Interest-based Multi-objective Evolutionary Search for Satisficing Concepts  
*Proceedings of the IEEE Conference on Systems, Man and Cybernetics, 2017.*
3. Moshaiov, A. The Paradox of Multimodal Optimization: Concepts vs. Species in Single and Multi-objective Problems  
*Proceedings of the IEEE Congress on Evolutionary Computation, 2016.*
4. Snir, A., Samina, B. and Moshaiov, A. Concept-based Evolutionary Multi-Criteria Exploration of Design Spaces under Run-time Limitation  
*Proceedings of the IEEE Symposium Series on Computational Intelligence, 2015.*
5. Moshaiov, A., Snir, A. and Samina, B. Concept-based Evolutionary Exploration of Design Spaces by a Resolution-Relaxation-Pareto Approach, *Proceedings of the IEEE Congress on Evolutionary Computation, pp. 1845 – 1852, 2015.*

## Multi-objective Neuroevolution: Topology and Weight Evolution of ANNs

1. Salih, A. and Moshaiov, A. Many-objective Topology and Weight Evolution of Neural-Networks,  
*Submitted to the International Joint Conference on Neural Networks, 2020.*
2. Abramovich, O. and Moshaiov, A. Multi-objective Topology and Weight Evolution of Neuro-controllers,  
*Proceedings of the IEEE Congress on Evolutionary Computation, 2016.*
3. Salih, A. and Moshaiov, A. Multi-objective Neuroevolution: Should the Main Reproduction Mechanism be Crossover or Mutation?  
*Proceedings of the IEEE Conference on Systems, Man and Cybernetics, 2016.*

## Multi-objective Games

1. Eisenstadt, E. and Moshaiov, A. Co-Evolutionary Algorithm for Solving Multi-Objective Games,  
*Submitted to Swarm and Evolutionary Computation, 2020*
2. Harel, M., Moshaiov, A. and Alkahr, D. Rationalizable Strategies for the Navigator-Target-Missile Game,  
*AIAA Journal of Guidance, Control, and Dynamics, 2020.*
3. Eisenstadt, E. and Moshaiov, A. Mutual Rationalizability in Vector-payoff Games  
*Proc. of the Int. Conf. on Evolutionary Multi-Criterion Optimization, 2019.*
4. Eisenstadt, E. and Moshaiov, A. Decision-making in Non-cooperative Games with Conflicting Self-objectives,  
*Journal of Multi-Criteria Decision Analysis, 2018.*
5. Alkahr, D. and Moshaiov, A. Non-dominated Strategies for Cautious to Courageous Aerial Navigation,  
*AIAA Journal of Guidance, Control, and Dynamics, 2018.*
6. Eisenstadt, E. and Moshaiov, A. Novel Solution Approach for Multi-objective Attack-Defense Cyber Games with Unknown Utilities of the Opponent, *IEEE Transactions on Emerging Topics in Computational Intelligence, 2017.*
7. Harel, M., Eisenstadt, E. and Moshaiov, A. Solving Multi-objective Games using A-priori Auxiliary Criteria,  
*Proceedings of the IEEE Congress on Evolutionary Computation, 2017.*
8. Eisenstadt, E., Moshaiov, A. and Avigad G. The Competing Travelling Salespersons Problem under Multi-criteria,  
*Proceedings of the International Conference on Parallel Problem Solving from Nature, PPSN 2016.*

## Fuzzy and Neuro-fuzzy Control

1. Gabbay, J., and Moshaiov, A. Towards Human-like Motion Control for Autonomous Driving in Rugged Terrains,  
*Submitted to the IEEE International Conference on Fuzzy Systems, 2020.*
2. Segal, G., Moshaiov, A., Amichay G. and Ayali, A. Neuro-fuzzy Learning of Locust's Marching in a Swarm.  
*Proceedings of the International Joint Conference on Neural Networks, 2016.*

## New Research Projects

1. AI to the Rescue: Life-and-Death Decision-Making under Conflicting Criteria – Funded by the Volkswagen Foundation.
2. Communication Network Design by Multi-Concept Optimization under Conflicting Objectives – Funded by the Israeli Defense Ministry.
3. Drought-related Functional Tradeoffs of Trees – In collaboration with the Int. Institute for Applied System Analysis (IIASA), Austria.

## Recent Graduates and Theses

1. Eisenstadt, E. – PhD Title: Co-Evolving Rationalizable Strategies for Zero-Sum Multi-Objective Games, 2019.
2. Alkahr, D. – PhD Title: Pareto-based Safe Aerial Navigation in the Presence of Medium-Range Energy Bleeding Missile, 2019.
3. Chananel, R. – MSc Title: Solving Attack-Defense Problems by Co-Evolution, 2019.
4. Samina, B. – MSc Title: Evolutionary Many Concept Optimization under Multiple Objectives, 2019.