Arash Bahari Kordabad - CV

Contact & Personal Information	*E-mail:* arashbk@mpi-sws.org *Homepage:* https://arashbaharik.github.io/ *Date and Place of Birth:* Feb.10,1995, Tabriz, Iran	Arashbahari20@gmail.com *Tell:* (+47) 48406162 *Nationality:* Iranian

Research Interests

Control Theory, Reinforcement Learning, Optimal Control, Model Predictive Control

Education

Max Planck Institute for software systems, Kaiserslautern, Germany

Postdoctoral Researcher, **May.2023 - present**
- Topic: "Multi-agent awareness and control with temporal logic specifications"
- Supervisor: Prof. Sadegh Soudjani

Norwegian University of Science and Technology (NTNU), Trondheim, Norway

Ph.D., Department of Engineering Cybernetics **Feb.2020 - April.2023**
- Thesis Topic: "Theoretical properties of Learning-based MPC"
- Supervisor: Prof. Sébastien Gros
- Co-Supervisor: Prof. Anastasios Lekkas

Sharif University of Technology, Tehran, Iran

M.S., Department of Mechanical Engineering **Sep.2017 - Sep.2019**
- Thesis Topic: "Control of Bifurcation and Chatter Suppression in Peripheral Milling Process"
- Supervisor: Prof. Hamed Moradi
- GPA: 19.41/20

University of Tabriz, Tabriz, Iran

B.S., Department of Mechanical Engineering **Sep.2013 - Sep.2017**
- Thesis Topic: "On the Muscle Models as Viscoelastic Material and Comparison of Force-Length Models for Active Skeletal Muscle"
- Supervisor: Prof. Kamal Jahani
- GPA: 18.1/20

Honors and Awards

Having received the honour as the First rank of Mechanical Engineering at Sharif University of Technology **2018**

Present among 40 top Mechanical Engineering students from all over the country. (Scientific Olympiads for university student) **2017**

Ranked Five among 99 Mechanical Engineering students in Bachelor Degree. **2017**

Ranked top 0.2 of 250,000 participants (669th) in the National Universities Entrance Exam known as "KONKOOR" for B.Sc. degree. **2013**

Selected Talks

- Reinforcement Learning for MPC, 22nd IFAC World Congress, Yokohama, Japan. **July 2023**

- Presenting two papers in ECC2023, Bucharest, Romania. **Jun 2023**

- Introduction to optimization with temporal logic. Trial Lecture on Ph.D. defense date, Trondheim, Norway. **Mar 2023**

- Intersection of Reinforcement Learning and MPC, Eindhoven University of Technology, Netherlands, Host: Prof. Dinesh Krishnamoorthy. **Feb 2023**

- MPC-based Reinforcement learning, École polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland, Host: Prof. Alireza Karimi. **Jan 2023**

- Equivalency of MDP and MPC, KTH, Stockholm, Sweden, Host: Prof. Bo Wahlberg. **Jan 2023**

- Presenting a paper in ECC2022, London, England. **July 2022**

- Intelligent control for time-delay systems, KTH, Stockholm, Sweden, Host: Prof. Håkan Hjalmarsson. **Jun 2019**

SELECTED COURSES	Advanced Nonlinear Systems (PhD course)	Numerical Optimal Control (PhD course)	
	Intelligent Systems:19.3/20	Nonlinear Control:19.3/20	Robust Control:19.3/20
	Advanced Mathematics:20/20	Stochastic Control:19.4/20	Advanced Dynamics:19.9/20
	Automatic Control:20/20	Modern Control:18.9/20	Robotic:20/20

ACADEMIC EXPERIENCE

Guest PhD **2021/11-2022/6**
Electrical and Electronic Engineering, Aalborg University, Aalborg, Denmark, with Prof. Wisniewski. Research area: Safe Reinforcement learning

Teaching Assistant **2018**
Automatic Control course for Undergraduate students at Sharif University of Technology.

Intelligent Systems Project **2018**
Solving Traveller Salesperson using the Continuous Genetic Algorithm, M. Broushaki.

Modern Control Project **2017**
Designing Luenberger Observer and Pole Placement Control for the Dual Inverse Pendulum in the state of Continuous and Discrete time, H. Salarieh.

Dynamic of Machinery Project **2015**
Design of Four-bar Linkage for Path Following, M. Ettefagh.

JOURNAL PUBLICATIONS

- **Bahari Kordabad, A.**, Gros, S. (2023). "Lyapunov-based robust optimal control for time-delay systems with application in milling process", *International Journal of Dynamics and Control*.

- W. Cai, **Bahari Kordabad, A.**, Gros, S. (2023). "Energy Management in Residential Microgrid Using Model Predictive Control-based Reinforcement Learning and Shapely Value". *Engineering Applications of Artificial Intelligence*.

- **Bahari Kordabad, A.**, Zanon, M., Gros, S. (2023). "Equivalence of Optimality Criteria for Markov Decision Process and Model Predictive Control". *IEEE Transactions on Automatic Control* .

- Nejatbakhsh Esfahani, H., **Bahari Kordabad, A.**, Cai, W., and Gros, S. (2023). "Learning-based State Estimation and Control using MHE and MPC Schemes with Imperfect Models", *European Journal of Control*.

- Seel, K., **Bahari Kordabad, A.**, Gros, S., Gravdahl, J.T. (2022). "Convex Neural Network-based Cost Modifications for Learning Model Predictive Control". *IEEE Open Journal of Control Systems* .

- **Bahari Kordabad, A.**, Wisniewski, R., Gros, S. (2022). "Safe Reinforcement Learning Using Wasserstein Distributionally Robust Model Predictive Control". *IEEE access.*

- **Bahari Kordabad, A.**, Gros, S. (2022). "Q-Learning of the Storage Function in Economic Nonlinear Model Predictive Control". *Engineering Applications of Artificial Intelligence.*

CONFERENCE
PUBLICATIONS

- **A. Bahari Kordabad** D. Reinhardt, A. S. Anand, and S. Gros, "Reinforcement Learning for MPC Fundamentals and Current Challenges", *IFAC World Congress*, 2023.
- **A. Bahari Kordabad**, and S. Gros, "Continuous-time Chance-constrained Stochastic Model Predictive Control using Multiple Shooting and CVaR", *2023 European Control Conference (ECC)*, 2023.
- **A. Bahari Kordabad**, and S. Gros, "Bias correction of discounted optimal steady state using cost modification", *2023 European Control Conference (ECC)*, 2023.
- **A. Bahari Kordabad**, and S. Gros, "Functional stability of discounted MDPs using Economic MPC dissipativity theory", *2022 European Control Conference (ECC)*, 2022.
- **A. Bahari Kordabad**, H. Nejatbakhsh Esfahani, W. Cai, and S. Gros, "Quasi-Newton Iteration in Deterministic Policy Gradient", *2022 American Control Conference (ACC)*, 2022.
- W.Cai, H. Nejatbakhsh Esfahani, **A. Bahari Kordabad**, and S. Gros, "Optimal Management of the Peak Power Penalty for Smart Grids Using MPC-based Reinforcement Learning", *60th Conference on Decision and Control (CDC)*, 2021.
- W.Cai, **A. Bahari Kordabad**, H. Nejatbakhsh Esfahani, A. M. Lekkas, and S. Gros, "MPC-based Reinforcement Learning for a Simplified Freight Mission of Autonomous Surface Vehicles", *60th Conference on Decision and Control (CDC)*, 2021.
- **A. Bahari Kordabad**, W. Cai, and S. Gros, "Multi-agent Battery Storage Management using MPC-based Reinforcement Learning", *2021 IEEE Conference on Control Technology and Applications (CCTA)*
- **A. Bahari Kordabad**, and S. Gros, "Verification of Dissipativity and Evaluation of Storage Function in Economic Nonlinear MPC using Q-Learning", *7th IFAC Conference on Nonlinear Model Predictive Control*, 2021.
- H. Nejatbakhsh Esfahani, **A. Bahari Kordabad**, and S. Gros, "Approximate Robust NMPC using Reinforcement Learning", *2021 European Control Conference (ECC)*
- **A. Bahari Kordabad**, H. Nejatbakhsh Esfahani, and S. Gros, "Bias Correction in Deterministic Policy Gradient Using Robust MPC", *2021 European Control Conference (ECC)*
- **A. Bahari Kordabad**, W. Cai, and S. Gros, "MPC-based reinforcement learning for economic problems with application to battery storage", *2021 European Control Conference (ECC)*
- H. Nejatbakhsh Esfahani, **A. Bahari Kordabad**, and S. Gros, "Reinforcement learning based on MPC/MHE for unmodeled and partially observable dynamics", *2021 American Control Conference (ACC).*
- **A. Bahari Kordabad**, H. Nejatbakhsh Esfahani, A. M. Lekkas, and S. Gros, "Reinforcement learning based on scenario-tree MPC for ASVs", *2021 American Control Conference (ACC).*

LANGUAGE	Persian(Native)	English (Advanced)	Norwegian (A2)	Danish (A1)

REFERENCES

Sebastien Gros
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Rafael Wisniewski
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