Saman Cyrus

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Contact Information

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Work Experience

Apple Inc., Cupertino, CA, USA 02/03/2020-05/29/2020
Controls Design Engineer Intern
Used model predictive control (active-set methods, interior-point methods) and explicit model predictive control.

Johnson Controls International, Milwaukee, WI, USA 01/07/2019-Present
Graduate intern
Working on the problem of model predictive controls for HVAC systems. As a graduate intern, my role is to investigate new ideas and novel applications of model predictive controls in building energy management using HVAC systems. This includes working with multi-objective optimization and mixed-integer linear programming problems.

PEOPLE Program, Madison, WI, USA Summer 2015, 2016

PSQ Co., Tehran, Iran 04/2010- 08/2013

Education

University of Wisconsin–Madison, Madison, WI, USA

Electrical and Computer Engineering (ECE) Department

- PhD Candidate, **Major:** ECE (Automatic Controls) **(Exp.) 10/2020**
  Minor: Computer Sciences
  Done with the coursework, qualifying exam, & Preliminary exam.
  Adviser: Dr. Laurent Lessard
  I work on the intersection of robust control and optimization. Formulating optimization problems as feedback systems and applying tools from control theory, i.e., $\mathcal{H}_2$ and $\mathcal{H}_\infty$ control, stability criteria like integral quadratic constraints (IQCs), passivity, the Circle criterion.

- M.Sc. in Electrical Engineering **05/2015**
  Thesis: Locational effects of variability of injected power on total cost

Mechanical Engineering Department

- M.Sc. in Mechanical Engineering **05/2018**

Computer Science (CS) Department

- M.Sc. in Computer Sciences (Optimization) **05/2017**

K.N.Toosi University of Technology, Tehran, Iran

Electrical Engineering Department

- M.Sc. in Electrical Engineering-Control **02/2013**
  Thesis: Fast Optimization Algorithms in Model Predictive Control

Iran University of Science & Technology, Tehran, Iran

Electrical Engineering Department

- B.Sc. in Electrical Engineering-Control **10/2009**

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Research Interests

Optimization, Machine Learning, Robust Control, Model Predictive Control

Teaching Experience

University of Wisconsin–Madison

- **Teaching Assistant** for Physics 109, Physics in The Arts 2015-2016
- **Teaching Assistant** for ECE 271, Electronics Lab., 2016-2017
- **Teaching Assistant** for Math/Stat/CS 525, Linear Programming Fall 2016

K.N.Toosi University of Technology

- **Teaching Assistant** for Linear Control Systems
- **Teaching Assistant** for Modern Control Engineering
- **Teaching Assistant** for Probability and Statistics

Iran University of Science and Technology

- **Teaching Assistant** for Electricity Physics
- **Teaching Assistant** for Electronics I

Professional Activities

Reviewer

- International Journal of Robust and Nonlinear Control
- American Control Conference (ACC)
- IEEE Conference on Decision and Control (CDC)
- IEEE Transactions on Automatic Control (TAC)
- SN Applied Sciences
- The Journal of Astronautical Sciences

Professional Activities

- Treasurer, Persian Student Society, University of Wisconsin Madison

Membership

- IEEE (member number: 90358575), SIAM (member number: 020045256)

Coursework

- **Engineering**

Course	Number	Institution
Linear Systems	ECE 717	UW–Madison
Optimal Systems	ECE 719	UW–Madison
Probability and Random Processes	ECE 730	UW–Madison
Nonlinear Systems	ECE 817	UW–Madison
Advanced Robotics	ECE/ME 739	UW–Madison
Physics-Based Modeling for Comp. Cntrl	ME 547	UW–Madison
Dynamics of Controlled Systems	ME 746	UW–Madison
Hybrid Control Systems		KNTU
Robust Control Systems		KNTU
Optimal Control Systems		KNTU
Fuzzy Control Systems		KNTU
Modern Control		IUST
Feedback Control Systems		IUST
Industrial Control systems		IUST
Operational Research		IUST

- **Computer Science & Math**

Course	Number	Institution
Introduction to Algorithms	CS 577	UW–Madison
Large-scale Machine Learn. & Opt.	CS 838	UW–Madison
Pattern Recognition	CS 532	UW–Madison
Linear Programming	CS 525	UW–Madison
Advanced Linear Programming	CS 526	UW–Madison
Stochastic Programming	CS 719	UW–Madison
Integer Programming	CS 720	UW–Madison
Nonlinear Programming I	CS 726	UW–Madison
Convex Analysis	CS 727	UW–Madison
Nonlinear Programming II	CS 730	UW–Madison
Artificial Neural networks and Fuzzy logic	CS 539	UW–Madison
Wireless Networks	CS 707	UW–Madison
Numerical Linear Algebra	CS 513	UW–Madison
Mathematical Analysis	Math 521	UW–Madison
Advanced Engineering Mathematics		KNTU
Probability and Statistics		IUST

Relevant Skills

Languages:	English, Persian, Arabic (fair), Spanish (beginner)
Typesetting:	Word, LaTeX
OS:	Mac, Windows, Linux (Ubuntu)
Other:	C++ (Intermediate), Python (familiar), Matlab (MPC Toolbox, Optimization Toolbox, Control system Toolbox), Simulink, Excel (Professional), Mathematica, Mql4, GAMS

Publications

Cyrus, S., Laurent L., "Unified Necessary and Sufficient Conditions for the Robust Stability of Interconnected Sector-Bounded Systems", *IEEE Conference on Decision and Control*, 7690-7695, Dec. 2019 (Nice, France).

Cyrus, S., Khaki-Sedigh, A., "Fast optimization algorithms in model predictive control," arXiv preprint arXiv:1904.07459 (2019).

Cyrus, S., Hu B., Van Scoy, B., Lessard, L., "A Robust Accelerated Optimization Algorithm for Strongly Convex Functions", *American Control Conference, 2018*, 1376-1381, June 2018. (Milwaukee, WI).

Cyrus, S., and Bernard L. "Locational effects of variability of injected power on total cost." *Power and Energy Conference at Illinois (PECI), 2015 IEEE.*

Presentation

- Optimization and Control Theory, Wisconsin Institute for Discovery, May 2018
- The intersection of control theory and first-order optimization, Wisconsin Institute for Discovery, June 2019.

References

Prof. Laurent Lessard, Professor
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Prof. Robert Nowak, Professor
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Dr. Michael Wenzel, Team Lead
Johnson Controls
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Dr. Pedro Santana, Staff Software Engineer
Special Projects Group
Apple
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