Isaac S. Klickstein, Ph.D.

Mechanical Engineering, Control Systems, Scientific Computing

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Professional Summary

Controls engineer and network scientist with a strong background in software design, development and optimization. Expertise includes numerical methods, graph theory, continuous and discrete optimization, and optimal control.

Software & Programming Skills

Programming: C/C++, Fortran (77 and modern), Matlab/GNU Octave, Python, Bash
Optimization: Coin-OR (Ipopt, CLP, CBC), GLPK, $\mathcal{PSOPT}$
Simulation: ANSYS, Solidworks, OpenFOAM

Work History

Research Assistant, 10/2015 - present
Department of Mechanical Engineering - University of New Mexico

- Conducted research projects that have resulted in publications in journals such as Nature Communications and Physical Review Letters
- Developed software related to applied optimal control, synchronization of multi-agent systems and control of networked systems

Teaching Assistant, 08/2015 - 12/2015
Department of Mechanical Engineering - University of New Mexico

- Lead labs that taught students machining skills and best practices
- Supervised student machine shop; managed and maintained inventory

Technical Specialist (Student), 10/2014 - 05/2015
Department of Mechanical Engineering - University of New Mexico

- Developed software and simulations for networked robotic agents

Management Experience

Team Managed (5 person team), 08/2014 - 05/2015
LOBOMotorsports (Formula SAE) - University of New Mexico

- Co-designed and manufactured brakes and wheels subsystem for 2015 vehicle
- Co-developed brake dynamics code in MATLAB with GUI in Java
- Maintained version controlled design iterations in Solidworks and ANSYS

Education

Ph.D., Mechanical Engineering, University of New Mexico, Albuquerque, 2020
Bachelor of Science, Mechanical Engineering, University of New Mexico, Albuquerque, 2015

Publications

- **Klickstein, I.**, Shirin, A., & Sorrentino F. (2017). Energy scaling of targeted optimal control of complex networks. *Nature communications*, 8, 1514. Online
- Shirin, A., **Klickstein, I.**, & Sorrentino F. (2017). Optimal control of complex networks: Balancing accuracy and energy of the control action. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 27(4), 041103. Online
- **Klickstein I.**, Shirin A., & Sorrentino F. (2017). Locally optimal control of complex networks. *Physical review letters*, 119(26), 268301. Online
- **Klickstein I.**, Kafle I., Bartaula S., & Sorrentino F. (2018). Energy scaling with control distance in complex networks. In *Circuits and Systems (ISCAS), 2018 IEEE International Symposium on* (pp. 1-5). IEEE. Online
- Kafle, I., Bartaula, S., Shirin, A., **Klickstein, I.**, Das, P., & Sorrentino, F. (2018). Optimal control of networks in the presence of attackers and defenders. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 28(5), 051103. Online
- **Klickstein, I.**, & Sorrentino, F. (2018). Control energy of lattice graphs. In *CDC 2018, IEEE Conference on Decision and Control*. Preprint
- **Klickstein, I.** & Sorrentino, F. (2018). Generating Graphs with Symmetry. *IEEE Transactions on Network Science and Engineering*. IEEEXplore
- **Klickstein, I.**, & Sorrentino, F. (2018). Control Distance and Energy Scaling of Complex Networks. *IEEE Transactions on Network Science and Engineering*. IEEEXplore
- Shirin, A., **Klickstein, I.**, Feng, S., Lin, Y.T., Hlavacek W., & Sorrentino F. (2019). Prediction of Optimal Drug Schedules for Controlling Autophagy. *Scientific Reports*, 9(1), 1428. Online
- Shirin, A., Della Rossa, F., **Klickstein, I.**, Russell, J.J., & Sorrentino, F. (2018). Optimal Regulation of Blood Glucose Level in Type I Diabetes using Insulin and Glucagon. *PloS one*, 14(3), e0213665 Online.
- **Klickstein, I.** and Sorrentino F. (2018). Generating Symmetric Graphs. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 28(12), 121102 Online.
- **Klickstein, I.**, Pecora L., and Sorrentino F. (2019). Symmetry Induced Group Consensus. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 29(7), 073101 Online
- Shirin, A., **Klickstein, I.**, and Sorrentino F. (2019). Stability Analysis of Reservoir Computes Dynamics via Lyapunov Functions. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 29(10), 103147 Online
- **Klickstein, I.**, & Sorrentino, F. (2020). The Controllability Gramian of Lattice Graphs. *Automatica* 114, 108833 Online
- Della Rossa, F., Pecora, L., Blaha, K., Shirin, A., **Klickstein, I.**, Sorrentino, F. (2020). Symmetries and cluster synchronization in multilayer networks. *Nature Communications* 11, 3179 Online

Presentations

- Presented *Control Energy of Lattice Graphs* at the IEEE Conference on Decision and Control 2018.
- Presented *Generating Graphs with Symmetries* at the Siam Conference on Applications of Dynamical Systems 2019.

Awards

Outstanding Graduate Student, Department of Mechanical Engineering, UNM, 2017
Passed PhD defense with **distinction,** Department of Mechanical Engineering, UNM, 2020