

# Publications

## Journals

- [J1] M. Hoang, D. Mukherjee, D. Zelazo, and H. Ahn, “Formations on directed cycles with bearing-only measurements,” *International Journal of Robust and Nonlinear Control (submitted)*, Mar. 2017.
- [J2] J. M. Montenbruck, D. Zelazo, and F. Allgöwer, “Fekete points, formation control, and the balancing problem,” *IEEE Transactions on Automatic Control (Early Access)*, vol. PP, no. 99, pp. 1–13, Mar. 2017.
- [J3] M. Sharf and D. Zelazo, “A network optimization approach to cooperative control synthesis,” *IEEE Control Systems Letters (submitted)*, Mar. 2017.
- [J4] S. Zhao and D. Zelazo, “Bearing rigidity theory and its applications for control and estimation of network systems: Life beyond distance rigidity,” *IEEE Control Systems Magazine (submitted)*, Mar. 2017.
- [J5] J. Rist, M. Dias, D. Zelazo, B. Cukurel, and M. Palman, “Economic dispatch of a single micro-gas turbine under chp operation,” *Applied Energy (submitted)*, Jan. 2017.
- [J6] M. Hoang, S. Zhao, Z. Sun, D. Zelazo, B. Anderson, and H. Ahn, “Bearing-based formation control of a group of agents with leader-first follower structure,” *IEEE Transactions on Automatic Control (submitted)*, Sep. 2016.
- [J7] S. Zhao and D. Zelazo, “Bearing-only network localization: localizability, sensitivity, and distributed protocols,” *Automatica*, vol. 69, pp. 334–341, 2016.
- [J8] —, “Bearing rigidity and almost global bearing-only formation stabilization,” *IEEE Transactions on Automatic Control*, vol. 61, no. 6, pp. 1255–1268, 2016.
- [J9] D. Zelazo and M. Bürger, “On the robustness of uncertain consensus networks,” *IEEE Transactions on Control of Network Systems (Early Access)*, vol. PP, no. 1, pp. 1–10, Oct. 2015.
- [J10] D. Zelazo, A. Franchi, H. H. Bühlhoff, and P. Robuffo Giordano, “Decentralized rigidity maintenance control with range-only measurements for multi-robot systems,” *International Journal of Robotics Research*, vol. 34, no. 1, pp. 105–128, Dec. 2014.
- [J11] M. Bürger, D. Zelazo, and F. Allgöwer, “Duality and network theory in passivity-based cooperative control,” *Automatica*, vol. 50, no. 8, pp. 2051–2061, Aug. 2014.
- [J12] —, “Hierarchical clustering of dynamical networks using a saddle-point analysis,” *IEEE Transactions on Automatic Control*, vol. 58, no. 1, pp. 113–124, Jan. 2013.
- [J13] D. Zelazo, M. Bürger, and F. Allgöwer, “A finite-time dual method for negotiation between dynamical systems,” *SIAM Journal on Control and Optimization*, vol. 51, no. 1, pp. 172–194, Jan. 2013.
- [J14] D. Zelazo, S. Schuler, and F. Allgöwer, “Cycles and performance in consensus networks,” *Systems & Control Letters*, vol. 62, no. 1, pp. 85–96, Jan. 2013.
- [J15] D. Zelazo, R. Dai, and M. Mesbahi, “An energy management system for off-grid power systems,” *Energy Systems*, vol. 3, no. 2, pp. 153–179, Jan. 2012.
- [J16] D. Zelazo and M. Mesbahi, “Graph-theoretic analysis and synthesis of relative sensing networks,” *IEEE Transactions on Automatic Control*, vol. 56, no. 5, pp. 971–982, May 2011.
- [J17] —, “Edge agreement: graph-theoretic performance bounds and passivity analysis,” *IEEE Transactions on Automatic Control*, vol. 56, no. 3, pp. 544–555, Mar. 2011.

## Peer Reviewed Conferences

- [C1] M. H. Trinh, D. Mukherjee, D. Zelazo, and H.-S. Ahn, “Finite-time bearing-only formation control,” in *IEEE Conference on Decision and Control (submitted)*, Melbourne, Australia, Dec. 2017.

- [C2] S. Zhao, Z. Sun, D. Zelazo, M. H. Trinh, and H.-S. Ahn, “Laman graphs are generically bearing rigid in arbitrary dimensions,” in *IEEE Conference on Decision and Control (submitted)*, Melbourne, Australia, Dec. 2017.
- [C3] N. Leiter and D. Zelazo, “Graph-based model reduction of the controlled consensus protocol,” in *IFAC World Congress (accepted)*, Toulouse, France, Sep. 2017.
- [C4] M. H. Trinh, D. Mukherjee, D. Zelazo, and H.-S. Ahn, “Planar bearing-only cyclic pursuit for target capture,” in *IFAC World Congress (accepted)*, Toulouse, France, Sep. 2017.
- [C5] Y. Ben Shoushan and D. Zelazo, “Negotiation between dynamical systems with connectivity constraints,” in *57th Israel Annual Conference on Aerospace Sciences (accepted)*, Tel-Aviv, Israel, Feb. 2017.
- [C6] D. Mukherjee, M. H. Trinh, D. Zelazo, and H.-S. Ahn, “Bearing-only cyclic pursuit in 2-d for capture of moving target,” in *57th Israel Annual Conference on Aerospace Sciences (accepted)*, Tel-Aviv, Israel, Feb. 2017.
- [C7] J. Rist, M. Dias, D. Zelazo, B. Cukurel, and M. Palman, “Optimal combined heat and power integration of a micro-gas turbine unit in distributed energy generation,” in *57th Israel Annual Conference on Aerospace Sciences (accepted)*, Tel-Aviv, Israel, Feb. 2017.
- [C8] D. Mukherjee and D. Zelazo, “Consensus over weighted digraphs: a robustness perspective,” in *55th IEEE Conference on Decision and Control*, Las Vegas, Nevada, Dec. 2016, pp. 3438–3443.
- [C9] —, “Robustness of heterogeneous cyclic pursuit,” in *56th Israel Annual Conference on Aerospace Sciences*, Haifa, Israel, Mar. 2016.
- [C10] F. Schiano, A. Franchi, D. Zelazo, and P. Giordano, “A rigidity-based decentralized bearing formation controller for groups of quadrotor uavs,” in *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Daejeon, Korea, 2016, pp. 5099–5106.
- [C11] M. M. Montenbruck, D. Zelazo, and F. Allgöwer, “Retraction balancing and formation control,” in *54th IEEE Conference on Decision and Control*, Osaka, Japan, Dec. 2015, pp. 3645–3650.
- [C12] D. Zelazo, P. Giordano, and A. Franchi, “Bearing-only formation control using an  $se(2)$  rigidity theory,” in *54th IEEE Conference on Decision and Control*, Osaka, Japan, Dec. 2015, pp. 6121–6126.
- [C13] S. Zhao and D. Zelazo, “Bearing-based formation stabilization with directed interaction topologies,” in *54th IEEE Conference on Decision and Control*, Osaka, Japan, Dec. 2015, pp. 6115–6120.
- [C14] —, “Bearing-based formation maneuvering,” in *IEEE International Symposium on Intelligent Control*, Sydney, Australia, Sep. 2015, pp. 658–663.
- [C15] O. Rozenheck, S. Zhao, and D. Zelazo, “A proportional-integral controller for distance-based formation tracking,” in *European Control Conference*, Linz, Austria, Jul. 2015, pp. 1693–1698.
- [C16] S. Zhao and D. Zelazo, “Bearing-based distributed control and estimation of multi-agent systems,” in *European Control Conference*, Linz, Austria, Jul. 2015, pp. 2207–2212.
- [C17] O. Rozenheck, S. Zhao, and D. Zelazo, “Formation velocity tracking with proportional control,” in *55th Israel Annual Conference on Aerospace Sciences*, Haifa, Israel, Feb. 2015.
- [C18] S. Zhao and D. Zelazo, “Bearing-constrained formation control using bearing measurements,” in *55th Israel Annual Conference on Aerospace Sciences*, Haifa, Israel, Feb. 2015.
- [C19] D. Zelazo and M. Bürger, “On the definiteness of the weighted laplacian and its connection to effective resistance,” in *53rd IEEE Conference on Decision and Control*, Los Angeles, CA, Dec. 2014, pp. 2895–2900.
- [C20] D. Zelazo, A. Franchi, and P. R. Giordano, “Rigidity theory in  $se(2)$  for unscaled relative position estimation using only bearing measurements,” in *European Control Conference*, Strasbourg, France, Jun. 2014, pp. 2703–2708.
- [C21] M. Bürger, D. Zelazo, and F. Allgöwer, “On the steady-state inverse-optimality of passivity-based cooperative control,” in *4th IFAC Workshop on Distributed Estimation and Control in Networked System*, V. Daniel, Ed., Koblenz, Germany, Sep. 2013, pp. 138–143.

- [C22] S. Schuler, D. Zelazo, and F. Allgöwer, “Robust design of sparse relative sensing networks,” in *European Control Conference*, Zürich, Switzerland, 2013, pp. 1860–1865.
- [C23] S. Schuler, D. Zelazo, and F. Allgöwer, “Design of sparse relative sensing networks,” in *51st IEEE Conference on Decision and Control*, Maui, HI, Dec. 2012, pp. 2749–2754.
- [C24] D. Zelazo and F. Allgöwer, “Eulerian consensus networks,” in *51st IEEE Conference on Decision and Control*, Maui, HI, Dec. 2012, pp. 4715–4720.
- [C25] M. Bürger, D. Zelazo, and F. Allgöwer, “Combinatorial insights and robustness analysis for clustering in dynamic networks,” in *American Control Conference*, Montreal, Canada, 2012, pp. 454–459.
- [C26] D. Zelazo and F. Allgöwer, “Growing optimally rigid formations,” in *American Control Conference*, Montreal, Canada, 2012, pp. 3901–3906.
- [C27] D. Zelazo, A. Franchi, F. Allgöwer, H. H. Bühlhoff, and P. Robuffo Giordano, “Rigidity maintenance control for multi-robot systems,” in *Proceedings of Robotics: Science and Systems*, Sydney, Australia, 2012, pp. 473–480.
- [C28] D. Zelazo, S. Schuler, and F. Allgöwer, “Cycles and sparse design of consensus networks,” in *51st IEEE Conference on Decision and Control*, Maui, HI, 2012, pp. 3803–3813.
- [C29] B. Briegel, D. Zelazo, M. Bürger, and F. Allgöwer, “On the zeros of consensus networks,” in *50th IEEE Conference on Decision and Control and European Control Conference*, Orlando, FL, Dec. 2011, pp. 1890–1895.
- [C30] M. Bürger, D. Zelazo, and F. Allgöwer, “Network clustering: a dynamical systems and saddle-point perspective,” in *50th IEEE Conference on Decision and Control and European Control Conference*, Orlando, FL, Dec. 2011, pp. 7825–7830.
- [C31] D. Zelazo, M. Bürger, and F. Allgöwer, “A distributed real-time algorithm for preference-based agreement,” in *Proc. 18th IFAC World Congress*, B. Sergio, Ed., Milan, Italy, Aug. 2011, pp. 8933–8938.
- [C32] D. Zelazo and M. Mesbahi, “ $\mathcal{H}_\infty$  performance and robust topology design of relative sensing networks,” in *American Control Conference*, Baltimore, MD, 2010, pp. 4474–4479.
- [C33] —, “ $\mathcal{H}_2$  performance of agreement protocol with noise: an edge based approach,” in *48th IEEE Conference on Decision and Control and 28th Chinese Control Conference*, Shanghai, China, Dec. 2009, pp. 4747–4752.
- [C34] —, “ $\mathcal{H}_2$  performance of relative sensing networks: analysis and synthesis,” in *AIAA Infotech@Aerospace Conference and AIAA Unmanned ... Unlimited Conference*, vol. 21, Seattle, WA, Apr. 2009, pp. 1–14.
- [C35] —, “ $\mathcal{H}_2$  analysis and synthesis of networked dynamic systems,” in *2009 American Control Conference*, St. Louis, MO, 2009, pp. 2966–2971.
- [C36] D. Zelazo, A. Rahmani, J. Sandhu, and M. Mesbahi, “Decentralized formation control via the edge laplacian,” in *American Control Conference*, Seattle, WA, Jun. 2008, pp. 783–788.
- [C37] D. Zelazo and M. Mesbahi, “On the observability properties of homogeneous and heterogeneous networked dynamic systems,” in *47th IEEE Conference on Decision and Control*, 2008, pp. 2997–3002.
- [C38] D. Zelazo, A. Rahmani, and M. Mesbahi, “Agreement via the edge laplacian,” in *46th IEEE Conference on Decision and Control*, New Orleans, LA, Dec. 2007, pp. 2309–2314.
- [C39] D. Zelazo, “Boundary filter design for biorthogonal filter banks,” in *6th International Conference on Signal Processing, 2002.*, Beijing, China, 2002, pp. 45–48.

## Book Chapter

- [Bk1] D. Zelazo, M. Bürger, and F. Allgöwer, “Dynamic negotiation under switching communication,” in *Mathematical System Theory – Festschrift in Honor of Uwe Helmke on the Occasion of his Sixtieth Birthday*, K. Hüper and J. Trumpp, Eds., CreateSpace, 2013, pp. 479–500.

- [Bk2] D. Zelazo and M. Mesbahi, “Graph-theoretic methods for networked dynamic systems: heterogeneity and h2 performance,” in *Efficient Modeling and Control of Large-Scale Systems*, J. Mohammadpour and K. M. Grigoriadis, Eds., Boston, MA: Springer US, 2010, pp. 219–249.

## Patents

- [P1] S.-W. J. Fu, K. J. Karimi, M. Mesbahi, and D. Zelazo, “Power management control system,” Patent US20130297089, Nov. 2013.
- [P2] D. Zelazo and S. D. Trautmann, “Sharing wavelet domain components among encoded signals,” Patent US 7890335, Feb. 2011.
- [P3] A. Sakurai, S. Trautmann, and D. Zelazo, “Time-scale modification of audio based on power-complementary iir filter decomposition,” Patent 20 070 081 663, Apr. 2007.
- [P4] S. Trautmann, A. Sakurai, and D. Zelazo, “Time-scale modification of audio using bark bands,” Patent 20 070 083 377, Apr. 2007.
- [P5] D. Zelazo, “Designing boundary filters for a biorthogonal filter bank,” Patent US 7062430, Jun. 2006.
- [P6] D. Zelazo and S. D. Trautman, “Efficient reconstruction,” Patent US 7039665, May 2006.
- [P7] A. Sakurai, S. Trautmann, and D. Zelazo, “Time-scale modification of music signals based on polyphase filterbanks and constrained time-domain processing,” Patent US 6982377, Jan. 2006.
- [P8] S. Trautmann, A. Sakurai, and D. Zelazo, “Time-scale modification of audio using separated frequency bands,” Patent 20 050 137 730, Jun. 2005.

## Thesis

- [Th1] D. Zelazo, “Graph-theoretic methods for the analysis and synthesis of networked dynamic systems,” PhD, University of Washington, 2009.
- [Th2] —, “Study of a mems laser range finder: integration, performance and design of a 2-axis mirror control system,” Masters of Engineering, Massachusetts Institute of Technology, 2001.

## Posters

- [Po1] J. Rist, M. Dias, D. Zelazo, B. Cukurel, and M. Palman, *Economic dispatch of a single micro-gas turbine under chp operation*, Future Electric Power Systems and the Energy Transition, Champéry, Switzerland, Feb. 2017.
- [Po2] M. Bürger, D. Zelazo, and F. Allgöwer, *Hierarchical clustering of dynamical networks using a saddle-point analysis*, Control Theory: Mathematical Perspectives on Complex Networked Systems, Oberwolfach, Germany, Feb. 2012.
- [Po3] —, *Coordination-free optimization and dynamic negotiation in peer-to-peer systems*, Algorithms and Dynamics Over Networks, Torino, Italy, Feb. 2012.
- [Po4] D. Zelazo, S. Schuler, and F. Allgöwer, *Performance and design of cycles in consensus networks*, Control Theory: Mathematical Perspectives on Complex Networked Systems, Oberwolfach, Germany, Feb. 2012.
- [Po5] M. Bürger, D. Zelazo, and F. Allgöwer, *Hierarchical clustering of dynamical networks using a saddle-point analysis*, IEEE CSS/UCSB CCDC Workshop on Vistas in Control, Santa Barbara, CA, Nov. 2011.
- [Po6] —, *Hierarchical clustering of dynamical networks using a saddle-point analysis*, 2011 Santa Barbara Control Workshop: Decision, Dynamics and Control in Multi-Agent Systems, Santa Barbara, CA, Jun. 2011.
- [Po7] —, *A finite-time dual method for negotiation between dynamical systems*, International Conference on Simulation Technology (SimTech2011), Stuttgart, Germany, Jun. 2011.

## Letters and Technical Reports

- [L1] M. Sharf and D. Zelazo, *On certain properties of convex functions*, Mar. 2017. arXiv: 1703.00867.
- [L2] A. Holland and D. Zelazo, *Sensitivity analysis in control versus biology*, Letter to the Editor of PLoS Biology regarding the 2009 PLoS Biol 7(1) e1000015 and e1000021 articles, 2011.

## Invited Talks

- [Tlk1] D. Zelazo, *Tbd*, SWARM 2017: The 2nd International Symposium on Swarm Behavior and Bio-Inspired Robotics, Kyoto, Japan, Nov. 2017.
- [Tlk2] —, *Fekete points, formation control, and the balancing problem*, Symposium on Control theory and Power Engineering, IEEE ICSEE, Eilat, Israel, Nov. 2016.
- [Tlk3] —, *Rigidity extensions for bearing-based formation control*, Taxonomies of Interconnected Systems: Partial and Imperfect Information in Multi-Agent Networks, CDC Workshop, Osaka, Japan, Dec. 2015.
- [Tlk4] —, *Bearing-based formation control problems*, Taxonomies of Interconnected Systems: Partial and Imperfect Information in Multi-Agent Networks, CDC Workshop, Osaka, Japan, Dec. 2015.
- [Tlk5] —, *Rigidity theory for multi-robot coordination*, IAAC workshop on Motion Control Methods in Robotics, Herzeliya, Israel, Nov. 2015.
- [Tlk6] —, *Uncertain consensus networks: Robustness and its connection to effective resistance*, Control Theory: A Mathematical Perspective on Cyber-Physical Systems, Mathematisches Forschungsinstitut Oberwolfach Workshops, Oberwolfach, Germany, Feb. 2015.
- [Tlk7] —, *Uncertain consensus networks: Robustness and its connection to effective resistance*, 2nd Swedish-Israeli Control Conference, Haifa, Israel, Nov. 2014.
- [Tlk8] —, *Rigidity theory for multi-robot coordination: Architectural needs and implementation challenges*, Taxonomies of Interconnected Systems: Topology in Distributed Robotics, IROS Workshop, Chicago, IL, Sep. 2014.

## Seminars

- [S1] D. Zelazo, *Fekete points, formation control, and the balancing problem*, IRISA - CNRS, Rennes, France, Feb. 2017.
- [S2] —, *Fekete points, formation control, and the balancing problem*, LAAS - CNRS, Toulouse, France, Feb. 2017.
- [S3] —, *Cyclically-monotone relations and their use in passivity-based cooperative control*, University of Groningen, Groningen, The Netherlands, Feb. 2017.
- [S4] —, *Distributed negotiation methods for multi-agent dynamical systems*, University of Tel-Aviv, Tel-Aviv, Israel, Dec. 2014.
- [S5] —, *Uncertain consensus networks: Robustness and its connection to effective resistance*, University of Washington, Seattle, WA, Dec. 2014.
- [S6] —, *Coordination and control of multi-robot systems*, EUROAVIA: Fly In - Technion, Haifa, Israel, Nov. 2014.
- [S7] —, *Robustness of uncertain consensus networks*, University of Illinois at Urbana-Champaign, Urbana-Champaign, IL, Sep. 2014.
- [S8] —, *Control and estimation of multi-agent systems with bearing-only sensing: Rigidity theory for  $se(2)$* , Colloquium Technische Kybernetik Seminar Series, University of Stuttgart, Stuttgart, Germany, Jul. 2014.
- [S9] —, *Distributed negotiation methods for multi-agent dynamical systems*, University of Freiburg, Freiburg, Germany, Jul. 2014.

- [S10] —, *Duality and network theory in passivity-based cooperative control*, University of Osaka, Osaka, Japan, Sep. 2013.
- [S11] —, *Rigidity maintenance for multi-robot systems*, University of Tokyo, Tokyo, Japan, Sep. 2013.
- [S12] —, *Distributed negotiation methods for multi-agent dynamical systems*, Jilin University, Changchun, China, Sep. 2013.
- [S13] —, *Performance and design of cycles in consensus networks*, North China Electric Power University, Beijing, China, Sep. 2013.
- [S14] —, *Rigidity theory for multi-agent systems*, Max Planck Institute, Tübingen, Germany, Aug. 2013.
- [S15] —, *Distributed negotiation methods for multi-agent dynamical systems*, University of Washington, Seattle, WA, Dec. 2012.
- [S16] —, *Formation rigidity: Dynamic maintenance and optimality*, Australian National University, Canberra, Australia, Jul. 2012.
- [S17] —, *Multi-agent systems: Perspectives on theory and applications*, Technion - Israel Institute of Technology, Haifa, Israel, Mar. 2012.
- [S18] —, *Networked dynamic systems: Theory and application for aerospace systems*, Technion - Israel Institute of Technology, Haifa, Israel, Mar. 2012.
- [S19] —, *Optimization as a tool for analysis: From dynamic negotiations to cluster synchronization*, Tokyo Institute of Technology, Tokyo, Japan, Jan. 2012.
- [S20] —, *An introduction to multi-agent systems*, University of Osaka, Osaka, Japan, Jan. 2012.
- [S21] —, *Optimization as a tool for analysis: From dynamic negotiations to cluster synchronization*, University of Miami, Miami, FL, Dec. 2011.
- [S22] —, *Edge-agreement: Graph-theoretic performance bounds and passivity analysis*, TÜ München, München, Germany, Aug. 2010.
- [S23] —, *Graph-theoretic methods for the analysis and synthesis of networked dynamic systems*, University of Stuttgart, Stuttgart, Germany, Oct. 2009.
- [S24] —, *Networked dynamic systems*, Technion - Israel Institute of Technology, Haifa, Israel, Mar. 2009.