

Masaki Ogura  
Curriculum Vitae  
Thursday 24<sup>th</sup> December, 2020

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## AREAS OF EXPERTISE

Control theory, network science, optimization, stochastic processes, biological physics

## EDUCATION

- Ph.D. in Mathematics, *Texas Tech University*. 2014
- M.Sc. in Informatics, *Kyoto University*. 2009
- B.Eng., *Kyoto University*. 2007

## PROFESSIONAL APPOINTMENTS

- Associate Professor, Department of Bioinformatic Engineering, Graduate School of Information Science and Technology, Osaka University, Japan. Nov 2019 – present
- Assistant Professor, Graduate School of Information Science, Nara Institute of Science and Technology, Japan. Mar 2017 – Oct 2019
- Postdoctoral Researcher, Department of Electrical and Systems Engineering, University of Pennsylvania, Oct 2014 – Feb 2017

## SHORT TERM VISITS

- Department of Mechanical Engineering, University of Hong Kong. 2018, 2019
- ICTEAM Institute, Université catholique de Louvain, Belgium. 2013

## SELECTED AWARDS AND HONORS

- Runner-up of the 2019 Best Paper Award, *IEEE Transactions on Network Science and Engineering*. 2019
- Summer Dissertation/Thesis Research Award, Texas Tech University. 2014
- Cash Family Endowed Fellowship, Texas Tech University. 2013
- Best Paper Award, The Society of Instrument and Control Engineers. 2012

## PUBLICATIONS

### Book Chapters

- [1] V. M. Preciado, M. Zargham, C. Nowzari, S. Han, M. Ogura, A. Jadbabaie, and G. J. Pappas, “Bio-inspired Framework for Allocation of Protection Resources in Cyber-Physical Networks,” in *Principles of Cyber-Physical Systems*. Cambridge University Press, 2020, pp. 293–322.
- [2] M. Ogura and V. M. Preciado, “Optimal Containment of Epidemics in Temporal and Adaptive Networks,” in *Temporal Networks Epidemiology*. Springer, 2017, pp. 241–266.
- [3] M. Ogura and C. F. Martin, “Linear Switching Systems and Random Products of Matrices,” in *Mathematical System Theory – Festschrift in Honor of Uwe Helmke on the Occasion of his Sixtieth Birthday*, K. Hüper and J. Trumpf, Eds. CreateSpace, 2013, pp. 291–300.

### Refereed Journal Articles

- [1] X. Chen, M. Ogura, and V. M. Preciado, “SDP-Based moment closure for epidemic spreading processes on networks,” *IEEE Transactions on Network Science and Engineering* (accepted for publication), 2020.
- [2] , , , and , “Geometric program,” *B*, vol. J103-B, no. 12, pp. 644–651, 2020.
- [3] M. Ogura, M. Kishida, and J. Lam, “Geometric programming for optimal positive linear systems,” *IEEE Transactions on Automatic Control*, vol. 65, no. 11, pp. 4648–4663, 2020.
- [4] C. Zhao, M. Ogura, M. Kishida, and A. Yassine, “Optimal resource allocation for dynamic product development process via convex optimization,” *Research in Engineering Design* (accepted for publication), 2020.
- [5] W. Mei, C. Zhao, M. Ogura, and K. Sugimoto, “Mixed  $H_2/H_\infty$  control of delayed Markov jump linear systems,” *IET Control Theory Applications*, vol. 14, no. 15, pp. 2076–2083, 2020.
- [6] C. Zhao, M. Ogura, and K. Sugimoto, “Stability optimization of positive semi-Markov jump linear systems via convex optimization,” *SICE Journal of Control, Measurement, and System Integration*, vol. 13, no. 5, pp. 233–239, 2020.
- [7] M. Kishida\*, M. Ogura\*, Y. Yoshida, and T. Wadayama, “Deep learning-based average consensus,” *IEEE Access*, vol. 8, pp. 142 404 – 142 412, 2020. (\*equal contribution)
- [8] X. Chen, M. Ogura, and V. M. Preciado, “Bounds on the spectral radius of digraphs from motif counts,” *SIAM Journal on Matrix Analysis and Applications*, vol. 41, no. 2, pp. 525–553, 2020.
- [9] N. Masuda, V. M. Preciado, and M. Ogura, “Analysis of the susceptible-infected-susceptible epidemic dynamics in networks via the non-backtracking matrix,” *IMA Journal of Applied Mathematics*, vol. 85, no. 2, pp. 214–230, 2020.
- [10] M. Ogura and V. M. Preciado, “Stability of SIS spreading processes in networks with non-Markovian transmission and recovery,” *IEEE Transactions on Control of Network Systems*, vol. 7, no. 1, pp. 349–359, 2020.

- [11] M. Ogura, W. Mei, and K. Sugimoto, “Synergistic effects in networked epidemic spreading dynamics,” *IEEE Transactions on Circuits and Systems II: Express Briefs*, vol. 67, no. 3, pp. 496–500, 2020.
- [12] , , and , “,” , vol. 56, no. 3, pp. 89–97, 2020.
- [13] , , , and , “,” , vol. 56, no. 3, pp. 141–148, 2020.
- [14] Y. Abe, M. Ogura, H. Tsuji, A. Miura, and S. Adachi, “Resource and network management framework for a large-scale satellite communications system,” *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, vol. E103, no. 2, pp. 492–501, 2020.
- [15] M. Ogura, J. Harada, M. Kishida, and A. Yassine, “Resource optimization of product development projects with time-varying dependency structure,” *Research in Engineering Design*, vol. 30, no. 3, pp. 435–452, 2019.
- [16] M. Ogura, V. M. Preciado, and N. Masuda, “Optimal containment of epidemics over temporal activity-driven networks,” *SIAM Journal on Applied Mathematics*, vol. 79, no. 3, pp. 986–1006, 2019.
- [17] , , and , “,” , vol. 55, no. 3, 2019.
- [18] W. Mei and M. Ogura, “Kronecker weights for instability analysis of Markov jump linear systems,” *IET Control Theory & Applications*, vol. 13, no. 3, pp. 360–366, 2019.
- [19] M. Wakaiki, M. Ogura, and J. P. Hespanha, “LQ-optimal sampled-data control under stochastic delays: gridding approach for stabilizability and detectability,” *SIAM Journal on Control and Optimization*, vol. 56, no. 4, pp. 2634–2661, 2018.
- [20] M. Ogura and V. M. Preciado, “Second-order moment-closure for tighter epidemic thresholds,” *Systems & Control Letters*, vol. 113, pp. 59–64, 2018.
- [21] M. Ogura, A. Cetinkaya, T. Hayakawa, and V. M. Preciado, “State feedback control of Markov jump linear systems with hidden-Markov mode observation,” *Automatica*, vol. 89, pp. 65–72, 2018.
- [22] M. Ogura and V. M. Preciado, “Optimal design of switched networks of positive linear systems via geometric programming,” *IEEE Transactions on Control of Network Systems*, vol. 4, no. 2, pp. 213–222, 2017.
- [23] M. Ogura, M. Wakaiki, H. Rubin, and V. M. Preciado, “Delayed bet-hedging resilience strategies under environmental fluctuations,” *Physical Review E*, vol. 95, p. 052404, 2017.
- [24] M. Ogura, V. M. Preciado, and R. M. Jungers, “Efficient method for computing lower bounds on the  $p$ -radius of switched linear systems,” *Systems & Control Letters*, vol. 94, pp. 159–164, 2016.
- [25] M. Ogura and V. M. Preciado, “Epidemic processes over adaptive state-dependent networks,” *Physical Review E*, vol. 93, p. 062316, 2016.
- [26] M. Ogura and V. M. Preciado, “Stability of Markov regenerative switched linear systems,” *Automatica*, vol. 69, pp. 169–175, 2016.

- [27] M. Ogura and V. M. Preciado, “Stability of spreading processes over time-varying large-scale networks,” *IEEE Transactions on Network Science and Engineering*, vol. 3, no. 1, pp. 44–57, 2016. Runner-up of **2019 IEEE TNSE Best Paper Award**.
- [28] M. Ogura and C. F. Martin, “Stability analysis of linear systems subject to regenerative switchings,” *Systems & Control Letters*, vol. 75, pp. 94–100, 2015.
- [29] M. Ogura and C. F. Martin, “A limit formula for joint spectral radius with  $p$ -radius of probability distributions,” *Linear Algebra and its Applications*, vol. 458, pp. 605–625, 2014.
- [30] M. Ogura and C. F. Martin, “Stability analysis of positive semi-Markovian jump linear systems with state resets,” *SIAM Journal on Control and Optimization*, vol. 52, pp. 1809–1831, 2014.
- [31] M. Ogura and C. F. Martin, “Generalized joint spectral radius and stability of switching systems,” *Linear Algebra and its Applications*, vol. 439, no. 8, pp. 2222–2239, 2013.
- [32] M. Ogura and Y. Yamamoto, “Dissipativity of pseudorational behaviors,” *IEEE Transactions on Automatic Control*, vol. 58, no. 4, pp. 823–833, 2013.
- [33] M. Nagahara, M. Ogura, and Y. Yamamoto, “ $H^\infty$  design of periodically nonuniform interpolation and decimation for non-band-limited signals,” *SICE Journal of Control, Measurement, and System Integration*, vol. 4, no. 5, pp. 341–348, 2011. **2012 SICE Best Paper Award**.

#### Refereed Conference Proceedings

- [1] M. Ogura, M. Kishida, and J. Lam, “Optimization of positive linear systems via geometric programming,” in *24th International Symposium on Mathematical Theory of Networks and Systems* (accepted), 2021.
- [2] M. Kumazaki, M. Ogura, and T. Tachibana, “Service chain construction with efficient VNF sharing based on model predictive control,” in *2020 International Conference on Emerging Technologies for Communications* (accepted), 2020.
- [3] C. Zhao, M. Ogura, and K. Sugimoto, “Finite-time control of discrete-time positive linear systems via convex optimization,” in *SICE Annual Conference 2020*, 2020, pp. 1230–1235.
- [4] T. Kimura and M. Ogura, “Distributed collaborative 3D-deployment of UAV base stations for on-demand coverage,” in *IEEE INFOCOM 2020*, 2020, pp. 1748–1757. Acceptance rate **19.8 percent**.
- [5] Y. Abe, M. Ogura, H. Tsuji, A. Miura, and S. Adachi, “Resource and network management for satellite communications systems: a chance-constrained approach,” in *IFAC World Congress 2020* (accepted), 2020.
- [6] M. Aida, C. Takano, and M. Ogura, “On the fundamental equation of user dynamics and the structure of online social networks,” in *NetSci-X 2020*, 2020, pp. 155–170.
- [7] M. Ogura, W. Mei, and K. Sugimoto, “Upper-bounding dynamics on networked synergistic susceptible-infected-susceptible model,” in *SICE Annual Conference 2019*, 2019, pp. 1430–1431.
- [8] M. Ogura, M. Kishida, K. Hayashi, and J. Lam, “Geometric programming for optimizing stability of distributed power control algorithms,” in *SICE Annual Conference 2019*, 2019, pp. 679–680.

- [9] M. Ogura, M. Kishida, and A. Yassine, “Optimizing product development projects under asynchronous and aperiodic system-local interactions,” in *21st International DSM Conference*, 2019, pp. 97–106.
- [10] M. Ogura, M. Kishida, K. Hayashi, and J. Lam, “Resource allocation for robust stabilization of Foschini-Miljanic Algorithm,” in *2019 American Control Conference*, 2019, pp. 4030–4035.
- [11] M. Kumazaki, M. Ogura, and T. Tachibana, “VNF management with model predictive control for multiple service chains,” in *IEEE International Conference on Consumer Electronics – Taiwan*, 2019.
- [12] T. Tadenuma, M. Ogura, and K. Sugimoto, “Sampled-data state observation over lossy networks under round-robin scheduling,” in *5th IFAC Conference on Analysis and Control of Chaotic Systems*, 2018, pp. 197–202. **Young Author Award Finalist.**
- [13] W. Mei and M. Ogura, “Instability analysis of Markov jump linear systems by spectral optimization,” in *SICE Annual Conference 2018*, 2018, pp. 419–422.
- [14] M. Ogura, J. Wan, and S. Kasahara, “Model predictive control for energy-efficient operation of data centers with cold aisle containments,” in *6th IFAC Conference on Nonlinear Model Predictive Control*, 2018, pp. 241–246.
- [15] M. Ogura and J. Harada, “Resource allocation for containing epidemics from temporal network data,” in *23rd International Symposium on Mathematical Theory of Networks and Systems*, 2018, pp. 537–542.
- [16] M. Ogura, J. Tagawa, and N. Masuda, “Distributed agreement on activity driven networks,” in *2018 American Control Conference*, 2018, pp. 4147–4152.
- [17] X. Chen, M. Ogura, K. R. Ghusinga, A. Singh, and V. M. Preciado, “Semidefinite bounds for moment dynamics: Application to epidemics on networks,” in *56th IEEE Conference on Decision and Control*, 2017, pp. 2448–2454.
- [18] M. Wakaiki, M. Ogura, and J. P. Hespanha, “Linear quadratic control for sampled-data systems with stochastic delays,” in *2017 American Control Conference*, 2017, pp. 1978–1983.
- [19] M. Ogura and V. M. Preciado, “Katz centrality of Markovian temporal networks: analysis and optimization,” in *2017 American Control Conference*, 2017, pp. 5001–5006.
- [20] M. Ogura, M. Wakaiki, and V. M. Preciado, “Dynamic analysis of bet-hedging strategies as a protection mechanism against environmental fluctuations,” in *55th IEEE Conference on Decision and Control*, 2016, pp. 4178–4183.
- [21] M. Ogura and V. M. Preciado, “Efficient containment of exact SIR Markovian processes on networks,” in *55th IEEE Conference on Decision and Control*, 2016, pp. 967–972.
- [22] M. Wakaiki, M. Ogura, and J. P. Hespanha, “Robust stability under asynchronous sensing and control,” in *55th IEEE Conference on Decision and Control*, 2016, pp. 5962–5967.
- [23] M. Ogura, A. Cetinkaya, T. Hayakawa, and V. M. Preciado, “Efficient criteria for stability of large-scale networked control systems,” in *6th IFAC Workshop on Distributed Estimation and Control in Networked Systems*, 2016, pp. 13–18.

- [24] V. M. Preciado and M. Ogura, “Structural analysis of spreading processes from ego-nets,” in *6th IFAC Workshop on Distributed Estimation and Control in Networked Systems*, 2016, pp. 345–350.
- [25] M. Ogura and V. M. Preciado, “Optimal design of networks of positive linear systems under stochastic uncertainty,” in *2016 American Control Conference*, 2016, pp. 2930–2935.
- [26] M. Ogura, M. Wakaiki, J. P. Hespanha, and V. M. Preciado, “ $L^2$ -gain analysis of regenerative switched linear systems under sampled-data state-feedback control,” in *2016 American Control Conference*, 2016, pp. 709–714.
- [27] M. Ogura and V. M. Preciado, “Cost-optimal switching protection strategy in adaptive networks,” in *54th IEEE Conference on Decision and Control*, 2015, pp. 3574–3579.
- [28] M. Ogura and V. M. Preciado, “Spreading processes over socio-technical networks with phase-type transmissions,” in *54th IEEE Conference on Decision and Control*, 2015, pp. 3548–3553.
- [29] C. Nowzari, M. Ogura, V. M. Preciado, and G. J. Pappas, “A general class of spreading processes with non-Markovian dynamics,” in *54th IEEE Conference on Decision and Control*, 2015, pp. 5073–5078.
- [30] C. Nowzari, M. Ogura, V. M. Preciado, and G. J. Pappas, “Optimal resource allocation for containing epidemics on time-varying networks,” in *49th Asilomar Conference on Signals, Systems and Computers*, 2015, pp. 1333–1337.
- [31] M. Ogura, M. Nagahara, and V. M. Preciado, “ $L^1$ -optimal disturbance rejection for disease spread over time-varying networks,” in *SWARM 2015: The First International Symposium on Swarm Behavior and Bio-Inspired Robotics*, 2015, pp. 377–378.
- [32] M. Ogura and V. M. Preciado, “Disease spread over randomly switched large-scale networks,” in *2015 American Control Conference*, 2015, pp. 1782–1787.
- [33] M. Ogura, A. Cetinkaya, and V. M. Preciado, “State-feedback stabilization of Markov jump linear systems with randomly observed markov states,” in *2015 American Control Conference*, 2015, pp. 1764–1769.
- [34] M. Ogura and R. M. Jungers, “Efficiently computable lower bounds for the  $p$ -radius of switching linear systems,” in *53rd IEEE Conference on Decision and Control*, 2014, pp. 5463–5468.
- [35] M. Ogura and C. F. Martin, “Mean stability of continuous-time semi-Markov jump linear positive systems,” in *2014 American Control Conference*, 2014, pp. 3261–3266.
- [36] M. Ogura and C. F. Martin, “On the mean stability of a class of switched linear systems,” in *52nd IEEE Conference on Decision and Control*, 2013, pp. 97–102.
- [37] M. Ogura and C. F. Martin, “Stability of switching systems and generalized joint spectral radius,” in *2013 European Control Conference*, 2013, pp. 3185–3190.
- [38] M. Ogura and C. F. Martin, “Stochastic properties of switched Riccati differential equations,” in *51st IEEE Conference on Decision and Control*, 2012, pp. 1319–1324.
- [39] M. Ogura, Y. Yamamoto, and J. C. Willems, “On the dissipativity of pseudorational behaviors,” in *49th IEEE Conference on Decision and Control*, 2010, pp. 1737–1742.

- [40] Y. Yamamoto, J. C. Willems, and M. Ogura, “Pseudorational behaviors and Bezoutians,” in *19th International Symposium on Mathematical Theory of Networks and Systems*, 2010, pp. 1917–1921.
- [41] M. Ogura and Y. Yamamoto, “Dissipativity of pseudorational behaviors,” in *19th International Symposium on Mathematical Theory of Networks and Systems*, 2010, pp. 849–853.
- [42] M. Ogura and Y. Yamamoto, “Hankel norm computation for pseudorational transfer functions,” in *48th IEEE Conference on Decision and Control held jointly with 2009 28th Chinese Control Conference*, 2009, pp. 5502–5507.
- [43] M. Nagahara, M. Ogura, and Y. Yamamoto, “A novel approach to repetitive control via sampled-data  $H^\infty$  filters,” in *7th Asian Control Conference*, 2009, pp. 160–165.
- [44] M. Nagahara, M. Ogura, and Y. Yamamoto, “Interpolation of nonuniformly decimated signals via sampled-data  $H^\infty$  optimization,” in *SICE Annual Conference 2008*, 2008, pp. 1151–1154.
- [45] M. Ogura, M. Nagahara, and Y. Yamamoto, “Optimal wavelet expansion via sampled-data  $H^\infty$  control theory,” in *SICE Annual Conference 2007*, 2007, pp. 1422–1426.

#### Invited and Hourly Talks

- [1] “,” 2020.
- [2] “,” *SICE*, 2020.
- [3] “ $\times \times$ ,” *Multi-Scale Neural Networks Laboratory*, 2020.
- [4] “—,” *20201*, 2020.
- [5] “Optimization of positive linear systems via geometric programming,” *Shenzhen University*, 2019.
- [6] “Optimization of positive linear systems via geometric programming,” *Guandong University of Technology*, 2019.
- [7] “Synthesis of positive linear systems by geometric programming,” *University of Hong Kong*, 2019.
- [8] “,” *2019*, 2019.
- [9] “,” 2019.
- [10] “,” 2019.
- [11] “Networked epidemic spreading: modeling, analysis, and control,” *National Insitutite of Informatics*, 2018.
- [12] “,” 279, 2018.
- [13] “,” 2018.
- [14] “Network epidemiology and control theory,” *University of Hong Kong*, 2018.
- [15] “,” 62, 2018.
- [16] “,” 2017.

- [17] “How can we “control” spreading processes over complex networks?” 4, 2017.
- [18] “,” *ERATO* , 2017.
- [19] “Analysis and control of spreading processes over complex networks,” *Washington State University*, 2017.
- [20] “Analysis and control of spreading processes over complex networks,” *Tokyo University of Agriculture and Technology*, 2016.
- [21] “Dynamical systems over time-varying networks,” *Tokyo Institute of Technology*, 2015.
- [22] “Dynamical systems over time-varying networks,” *Workshop on Recent Advances in Systems and Control*, Kyoto University, 2015.
- [23] “Stability analysis of switched linear systems with non-traditional switching signals,” in *GRASP special seminar*, University of Pennsylvania, 2014.
- [24] “Mean stability of switched linear systems,” *Université Catholique de Louvain*, 2013.

## TEACHING ACTIVITIES

### **Nara Institute of Science and Technology**

- Machine Learning and Intelligent Control (Spring 2019)
- Advanced Intelligent System Control (Spring 2017, 2018)

### **University of Pennsylvania**

Co-lecturer:

- Convex Optimization in Systems and Control (Fall 2015)

### **Texas Tech University**

Graduate Part-Time Instructor:

- Calculus II (Summer 2014, Spring 2014, Spring 2013)
- Calculus I (Summer 2013, Fall 2012)
- Trigonometry (Fall 2011)
- College Algebra (Fall 2013, Spring 2012)

Teaching Assistant:

- Advanced Calculus (Summer 2012)
- Linear Algebra (Summer 2012)
- Higher Mathematics for Engineers and Scientists I (Summer 2011)

### **Kyoto School of Computer Science**

Lecturer:

- Control Engineering (Fall 2009, Fall 2008)
- Electrical Circuits (Spring 2008)
- Data Structures (Spring 2008)
- Numerical Analysis (Spring 2010, Spring 2009)



## **Kyoto University**

Teaching Assistant:

- Modern Control Theory (Fall 2009, Fall 2008)

## **PROFESSIONAL SERVICE**

- Program Committee member, International Conference on Complex Networks and their Applications, 2020–.
- Technical Program Committee member, International Conference on Decision Aid Sciences and Applications, 2020.
- Associate Editor, Journal of The Franklin Institute, 2020–.
- Local Arrangements Vice Chair, SICE Annual Conference 2018.
- Associate Editor, The 5th IFAC Workshop on Distributed Estimation and Control in Networked Systems, 2015 .

### **0.1 Journal Reviewer**

Annual Reviews in Control; Automatica; Applied Mathematics and Computation; Asian Journal of Control; Computer Communications; European Journal of Control European Physical Journal B; Foundations of Computational Mathematics; IEEE/ACM Transactions on Computational Biology and Bioinformatics IEEE Control Systems Letters; IEEE Intelligent Systems; IEEE Transactions on Automatic Control; IEEE Transactions on Big Data; IEEE Transactions on Circuits and Systems; IEEE Transactions on Control of Network Systems; IEEE Transactions on Fuzzy Systems; IEEE Transactions on Signal Processing; IEEE Transactions on Systems, Man and Cybernetics: Systems; IEEE Transactions on Network Science and Engineering; IEEE Transactions on Neural Networks and Learning Systems; IET Control Theory & Applications; International Journal of Robust and Nonlinear Control; Journal of Biological Dynamics; Journal of the Franklin Institute; Mathematics of Control, Signals, and Systems; Neurocomputing; Non-linear Analysis: Hybrid Systems; Operations Research and Decisions; Physica A; Physics Letters A; SIAM Journal on Control and Optimization; SICE Journal of Control, Measurement, and System Integration; Stochastics and Dynamics; Systems and Control Letters; Research in Engineering Design;

Masaki Ogura, December 2020