Rui Kato

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Education

March 2024	D.Eng. in Computer Science, March 2024 Tokyo Institute of Technology, Yokohama, Japan Thesis: Stability and Dimension in Feedback Systems: A Differential Lyapunov Framework Advisor: Professor Hideaki Ishii
March 2021	M.Eng. in Computer Science Tokyo Institute of Technology, Yokohama, Japan Thesis: Averaging and Cluster Synchronization of Kuramoto Oscillators
March 2019	B.Eng. in Control Systems Engineering Tokyo Institute of Technology, Yokohama, Japan Thesis: Qualitative Analysis of Nonlinear Networked Control Systems under Denial-of-Service Attacks

Research Interests

I am interested in theoretical foundations for dynamical systems and networked control. My favorite research tools are the first and second Lyapunov methods. Currently, I am studying dimension theory for dynamical systems and its applications in feedback/interconnected systems. Another interest lies in nonlinear oscillations and networks. My goal is to understand and control self-excited/hidden oscillations and cluster/remote synchronization.

Publications

Submitted

1. Ryota Kokubo, Mitsuaki Matsubara, **Rui Kato**, and Hideaki Ishii, “Cluster synchronization of Kuramoto oscillators via pacemakers and mean-phase feedback control,” submitted to the 63rd IEEE Conference on Decision and Control, 2024.

Journals

4. **Rui Kato** and Hideaki Ishii, “Cluster synchronization of Kuramoto oscillators and the method of averaging,” *IEEE Transactions on Automatic Control*, 2023 (accepted as full paper).

3. **Rui Kato** and Hideaki Ishii, “Hausdorff dimension estimates for interconnected systems with variable metrics,” *IEEE Control Systems Letters*, vol. 7, pp. 3247–3252, 2023.

2. **Rui Kato**, Ahmet Cetinkaya, and Hideaki Ishii, "Linearization-based quantized stabilization of nonlinear systems under DoS attacks," *IEEE Transactions on Automatic Control*, vol. 67, no. 12, pp. 6826–6833, 2022.

1. **Rui Kato**, Ahmet Cetinkaya, and Hideaki Ishii, "Security analysis of linearization for nonlinear networked control systems under DoS," *IEEE Transactions on Control of Network Systems*, vol. 8, no. 4, pp. 1692–1704, 2021.

Conference Proceedings

5. **Rui Kato** and Hideaki Ishii, "A unified framework on global stability and Lyapunov dimension of Lur'e systems," *Proceedings of the 2024 European Control Conference*, 2024 (to appear).

4. **Rui Kato** and Hideaki Ishii "Dimension analysis via differential Lyapunov and dissipation inequalities," *Proceedings of the 22nd IFAC World Congress*, pp. 65–70, 2023.

3. **Rui Kato** and Hideaki Ishii, "Averaging and cluster synchronization of Kuramoto oscillators," *Proceedings of the 2021 European Control Conference*, pp. 1497–1502, 2021.

2. **Rui Kato**, Ahmet Cetinkaya, and Hideaki Ishii, "DoS-aware quantized control of nonlinear systems via linearization," *Proceedings of the 21st IFAC World Congress*, pp. 3054–3059, 2020.

1. **Rui Kato**, Ahmet Cetinkaya, and Hideaki Ishii, "Stabilization of nonlinear networked control systems under denial-of-service attacks: A linearization approach," *Proceedings of the 2019 American Control Conference*, pp. 1444–1449, 2019.

Awards

2022 SICE Control Division Young Author Award
2020 SICE Young Author Award

Fellowship

April 2021–March 2024 Research Fellow of the Japan Society for the Promotion of Science (JSPS)