杨国松

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研究方向

切换系统和混合系统（switched and hybrid systems）、网络化控制系统（networked control systems）和博弈学习（learning in games），及其在网络实体系统（cyber-physical systems, CPS）和网络安全（network security）中的应用。

工作履历

加利福尼亚大学圣巴巴拉分校，美国 2017 年 8 月–现在

博士后，控制、动态系统和运算中心

导师：João P. Hespanha 教授

加利福尼亚大学圣巴巴拉分校，美国 2017 年 5 月–2017 年 7 月

访问学者，电子与计算机工程学系

导师：João P. Hespanha 教授

教育背景

伊利诺伊大学厄巴纳-尚佩恩分校，美国 2013 年 10 月–2017 年 8 月

博士（电子与计算机工程学）

毕业论文："Switched and hybrid systems with inputs: Small-gain theorems, control with limited information, and topological entropy"

导师：Daniel Liberzon 教授

伊利诺伊大学厄巴纳-尚佩恩分校，美国 2011 年 8 月–2013 年 8 月

硕士（电子与计算机工程学）

毕业论文："A Lyapunov-based small-gain theorem for interconnected switched systems"

导师：Daniel Liberzon 教授

香港科技大学，中国香港 2007 年 9 月–2011 年 6 月

学士（电子工程学，辅修数学）

导师：李泽湘教授

奖项与荣誉

- *ACM SIGBED HSCC Best Paper Award* at the 22nd ACM International Conference on Hybrid Systems: Computation and Control, 2019

- *Best Poster Award* at the 11th Coordinated Science Laboratory Student Conference, University of Illinois at Urbana-Champaign, 2016
- *Graduate College Conference Travel Award*, University of Illinois at Urbana-Champaign, 2016
- *University Scholarship*, *School of Engineering Scholarship*, *ECE Outstanding Freshmen Scholarship*, *The Joseph Lau Luen Hung Charitable Trust Scholarship*, Hong Kong University of Science and Technology, 2007–2011
- *Gold medal*, 8th Asian Physics Olympiad, 2007

学术成果

工作论文

1. H. Ferraz, G. Yang, and J. P. Hespanha, "Distributed leader-follower model predictive control."
2. G. Yang, D. Liberzon, and J. P. Hespanha, "Topological entropy of nonlinear switched and time-varying systems."
3. G. Yang, R. Poovendran, and J. P. Hespanha, "Adaptive learning in two-player Stackelberg games with application to network security."

期刊论文

1. G. Yang, A. J. Schmidt, D. Liberzon, and J. P. Hespanha, "Topological entropy of switched linear systems: General matrices and matrices with commutation relations," *Mathematics of Control, Signals, and Systems*, vol. 32, no. 3, pp. 411–453, Sep. 2020（中科院分区：工程技术 4 区；自动化与控制系统 4 区、工程：电子与电气 4 区、数学跨学科应用 4 区）
2. G. Yang and D. Liberzon, "Feedback stabilization of a switched linear system with an unknown disturbance under data-rate constraints," *IEEE Transactions on Automatic Control*, vol. 63, no. 7, pp. 2107–2122, Jul. 2018（中科院分区：工程技术 2 区；自动化与控制系统 2 区、工程：电子与电气 2 区）
3. K. Okano, M. Wakaiki, G. Yang, and J. P. Hespanha, "Stabilization of networked control systems under clock offsets and quantization," *IEEE Transactions on Automatic Control*, vol. 63, no. 6, pp. 1708–1723, Jun. 2018（中科院分区：工程技术 2 区；自动化与控制系统 2 区、工程：电子与电气 2 区）
4. A. Mironchenko, G. Yang, and D. Liberzon, "Lyapunov small-gain theorems for networks of not necessarily ISS hybrid systems," *Automatica*, vol. 88, pp. 10–20, Feb. 2018（中科院分区：工程技术 1 区；自动化与控制系统 1 区、工程：电子与电气 2 区）
5. G. Yang and D. Liberzon, "A Lyapunov-based small-gain theorem for interconnected switched systems," *Systems & Control Letters*, vol. 78, pp. 47–54, Apr. 2015（中科院分区：工程技术 3 区；自动化与控制系统 3 区、工程：电子与电气 3 区）

书籍章节

1. G. Yang and J. P. Hespanha, "Modeling and mitigating link-flooding distributed denial-of-service attacks via learning in Stackelberg games," in *Handbook of Reinforcement Learning and Control*, K. G. Vamvoudakis, Y. Wan, F. L. Lewis, and D. Cansever, Eds. Springer, to be published

会议论文

1. G. Yang, D. Liberzon, and J. P. Hespanha, "Topological entropy of switched nonlinear systems," submitted for publication
2. G. Yang, R. Poovendran, and J. P. Hespanha, "Adaptive learning in two-player Stackelberg games with continuous action sets," in *58th IEEE Conference on Decision and Control*, 2019, pp. 6905–6911
3. G. Yang, J. P. Hespanha, and D. Liberzon, "On topological entropy and stability of switched linear systems," in *22nd ACM International Conference on Hybrid Systems: Computation and Control*, 2019, pp. 119–127 **(Best Paper Award winner)**
4. G. Yang and J. P. Hespanha, "On topological entropy of switched linear systems with pairwise commuting matrices," in *56th Annual Allerton Conference on Communication, Control, and Computing*, 2018, pp. 429–436 (invited paper)
5. G. Yang, A. J. Schmidt, and D. Liberzon, "On topological entropy of switched linear systems with diagonal, triangular, and general matrices," in *57th IEEE Conference on Decision and Control*, 2018, pp. 5682–5687
6. G. Yang, H. Hosseini, D. Sahabandu, A. Clark, J. P. Hespanha, and R. Poovendran, "Modeling and mitigating the Coremelt attack," in *2018 American Control Conference*, 2018, pp. 3410–3416
7. G. Yang, D. Liberzon, and Z.-P. Jiang, "Stabilization of interconnected switched control-affine systems via a Lyapunov-based small-gain approach," in *2017 American Control Conference*, 2017, pp. 5182–5187
8. G. Yang, D. Liberzon, and A. Mironchenko, "Analysis of different Lyapunov function constructions for interconnected hybrid systems," in *55th IEEE Conference on Decision and Control*, 2016, pp. 465–470 (invited paper)
9. G. Yang and D. Liberzon, "Finite data-rate stabilization of a switched linear system with unknown disturbance," in *10th IFAC Symposium on Nonlinear Control Systems*, vol. 49, no. 18, 2016, pp. 1085–1090
10. G. Yang and D. Liberzon, "Stabilizing a switched linear system with disturbance by sampled-data quantized feedback," in *2015 American Control Conference*, 2015, pp. 2193–2198
11. G. Yang and D. Liberzon, "Input-to-state stability for switched systems with unstable subsystems: A hybrid Lyapunov construction," in *53rd IEEE Conference on Decision and Control*, 2014, pp. 6240–6245
12. A. Mironchenko, G. Yang, and D. Liberzon, "Lyapunov small-gain theorems for not necessarily ISS hybrid systems," in *21st International Symposium on Mathematical Theory of Networks and Systems*, 2014, pp. 1001–1008

科研项目申请经历

- Coauthor of the National Science Foundation grant CMMI-1662708: "Switched Control Systems with Limited Information: An Entropy Approach to Stabilization and Disturbance Attenuation" (Program: Dynamics, Control and Systems Diagnostics), PI: Daniel Liberzon, 2017–2020, Award: $349,540（依托单位：伊利诺伊大学厄巴纳-尚佩恩分校）

科研项目参与经历

- National Science Foundation grant ECCS-2029985: "RAPID: Informed Decision Making for Pandemic Management" (Program: COVID-19 Research), PI: João P. Hespanha, 2020–2021, Award: $146,274（依托单位：加利福尼亚大学圣巴巴拉分校）
- National Science Foundation grant EPCN-1608880: "Online Optimization for the Control of Small Autonomous Vehicles" (Program: Energy, Power, Control, and Networks), PI: João P. Hespanha, 2016–2021, Award: $359,838（依托单位：加利福尼亚大学圣巴巴拉分校）
- Office of Naval Research grant N00014-16-1-2710: "ADAPT: Analytical Framework for Actionable Defense against Advanced Persistent Threats" (Program: Multidisciplinary University Research Initiatives), Leading PI: Radha Poovendran, PI: João P. Hespanha, 2016–2021（依托单位：加利福尼亚大学圣巴巴拉分校）
- National Science Foundation grant CNS-1329650: "ROSELINE: Enabling Robust, Secure, and Efficient Knowledge of Time Across the System Stack" (Program: Cyber Physical Systems), PI: João P. Hespanha, 2014–2020, Award: $544,726（依托单位：加利福尼亚大学圣巴巴拉分校）
- National Science Foundation grant CMMI-1662708: "Switched Control Systems with Limited Information: An Entropy Approach to Stabilization and Disturbance Attenuation" (Program: Dynamics, Control and Systems Diagnostics), PI: Daniel Liberzon, 2017–2020, Award: $349,540（依托单位：伊利诺伊大学厄巴纳-尚佩恩分校）
- National Science Foundation grant ECCS-1231196: "Hybrid Small-gain Theorems for Nonlinear Networked and Quantized Control Systems" (Program: Energy, Power, Control, and Networks), PI: Daniel Liberzon, 2012–2016, Award: $240,000（依托单位：伊利诺伊大学厄巴纳-尚佩恩分校）
- National Science Foundation grant CNS-1217811: "Limited-Information Control of Hybrid Systems via Reachable Set Propagation" (Program: Computer Systems Research), PI: Daniel Liberzon, 2012–2016, Award: $280,000（依托单位：伊利诺伊大学厄巴纳-尚佩恩分校）

会议报告、组织与特邀报告

- 会议报告：*37th Southern California Control Workshop*, University of California, San Diego, CA, USA, Jan. 2020
- 会议报告：*22nd ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2019)*, Montreal, Canada, Apr. 2019 (Best Paper Award winner)
- 会议报告：*57th IEEE Conference on Decision and Control (CDC 2018)*, Miami Beach, FL, USA, Dec. 2018
- 会议分会主席: Session on "Switched Systems" at the *57th IEEE Conference on Decision and Control*, Miami Beach, FL, USA, Dec. 2018
- 会议报告：*35th Southern California Control Workshop*, University of California, Los Angeles, CA, USA, Nov. 2018
- 会议报告：*56th Annual Allerton Conference on Communication, Control, and Computing (Allerton 2018)*, Monticello, IL, USA, Oct. 2018
- 会议报告：*2018 American Control Conference (ACC 2018)*, Milwaukee, WI, USA, Jun. 2018
- 会议报告：*2017 American Control Conference (ACC 2017)*, Seattle, WA, USA, May 2017
- 特邀报告：*Multi-Agent Robotics Lab*, University of California, San Diego, CA, USA, Mar. 2017 (Host:

Jorge Cortés and Sonia Martínez)

- 特邀报告：*Hybrid Systems Laboratory*, University of California, Santa Cruz, CA, USA, Feb. 2017 (Host: Ricardo G. Sanfelice)
- 会议报告：*55th IEEE Conference on Decision and Control (CDC 2016)*, Las Vegas, NV, USA, Dec. 2016
- 特邀报告：*Center for Control, Dynamical Systems, and Computation*, University of California, Santa Barbara, CA, USA, Nov. 2016 (Host: Andrew R. Teel)
- 特邀报告：*Cyber-Physical Systems Laboratory*, University of California, Los Angeles, CA, USA, Oct. 2016 (Host: Paulo Tabuada)
- 会议报告：*10th IFAC Symposium on Nonlinear Control Systems (NOLCOS 2016)*, Monterey, CA, USA, Aug. 2016
- 会议海报报告：*11th Coordinated Science Laboratory Student Conference (CSLSC 2016)*, Urbana, IL, USA, Feb. 2016 (Best Poster Award winner)
- 会议报告：*2015 American Control Conference (ACC 2015)*, Chicago, IL, USA, Jul. 2015
- 会议报告：*53rd IEEE Conference on Decision and Control (CDC 2014)*, Los Angeles, CA, USA, Dec. 2014
- 会议报告：*2nd Midwest Workshop on Control and Game Theory*, University of Notre Dame, Notre Dame, IN, USA, Apr. 2013

教学与学生指导经历

加利福尼亚大学圣巴巴拉分校，美国

- 本科生科研项目导师："Remote Tracking of Unmanned Ground Vehicles"
- 高中生科研项目导师："Motion Planning for Unmanned Ground Vehicles"

伊利诺伊大学厄巴纳-尚佩恩分校，美国

- 研究生课程助教："ECE517 Nonlinear and Adaptive Control"（非线性与自适应控制）
- 研究生课程助教："ECE528 Analysis of Nonlinear Systems"（非线性系统分析）

期刊及会议审稿人

期刊审稿人

- *IEEE Transactions on Automatic Control*
- *IFAC Automatica*
- *System & Control Letters*
- *Mathematics of Control, Signals, and Systems*
- *Nonlinear Analysis: Hybrid Systems*
- *IEEE Control Systems Letters*
- *Communications in Nonlinear Science and Numerical Simulation*

会议审稿人

- *IEEE Conference on Decision and Control* (2019 and 2020)
- *IFAC World Congress* (2020)
- *IFAC Workshop on Distributed Estimation and Control in Networked Systems* (2019)
- *American Control Conference* (2017 and 2018)
- *ACM International Conference on Hybrid Systems: Computation and Control* (2016 and 2017)
- *IFAC Conference on Modelling, Identification and Control of Nonlinear Systems* (2015)