

硕士生导师简介

李绍宝，男，博士，副教授，博士生导师。2014年8月毕业于香港城市大学机械及生物医学工程专业，获工学博士学位。2015年12月-2019年11月，先后在新加坡南洋理工大学、新加坡国立大学、丹麦奥尔堡大学从事博士后工作。2020年9月起在燕山大学电气工程学院自动化系工作，主要从事过程控制系统智能控制、多自主体协调控制、复杂网络优化等方面的研究。主持了国家自然科学基金面上、青年基金2项，河北省中央引导地方、河北省高等学校科学技术研究重点项目等省部级纵向项目6项，作为骨干参与国家自然科学基金重点项目一项。在IEEE Trans Automatic Control、Automatica、IEEE Trans. Systems, Man, and Cybernetics: Systems等期刊会议上发表学术论文80余篇，获河北省自然科学二等奖1项、河北优秀硕士论文、香港城市大学研究生杰出学术成就奖、智海2016 OI中国水下机器人大赛三等奖，获2023 ICoIAS国际会议最佳会议论文、第10届 WCICA国际会议最佳论文提名奖等奖项。



一、主要招生专业及研究方向

控制工程：

(1)油水分离系统的鲁棒强化学习控制

响应国家“新质生产力”发展需求，研究多耦合约束下的海上石油平台油水分离系统协调控制，结合数字孪生技术，构建远程数字化监控系统，实现油水分离系统的智能化管控。

(2)水下机器人协同观测与组网

基于安全强化学习技术，研究多水下机器人的协同控制、水下目标观测、多目标优化与决策，实现水下机器人集群感知和分布式组网性能优化。

(3)复杂网络模型辨识与控制优化

面向复杂网络的控制性能优化问题，采用强化学习及能控能观性分析方法，研究基于数据驱动的复杂网络模型参数反演方法，揭示控制输入与输出调控性能的映射关系。

二、主要科研项目

- 2023.01-2026.12, 面向水下协调观测的潜器网络集群学习与优化, 国家自然科学基金面上项目(62273294), 54万, 主持;
- 2021.01-2026.12, 基于感知-传输-控制一体化设计的水下目标探测理论与关键技术, 国家自然科学基金重点项目(62033011), 343.6万, 参与;
- 2023.01-2025.12, 基于安全强化学习的油水分离鲁棒学习控制与优化, 中央引导地方科技发展资金项目(236Z3302G), 15万, 主持;
- 2022.01-2024.12, 面向多目标观测的异构海洋机器人协调博弈优化方法研究, 河北省高等学校科学技术研究重点项目(ZD2022104), 7.5万, 主持;
- 2022.01-2024.12, 基于集群学习的多潜器协调组网与容错控制, 河北省引进留学人员资助项目优秀类(C20220506), 5万, 主持;
- 2017.01-2020.12, 通信约束下异构网络化系统的一致性控制及性能优化, 河北省自然科学基金青年基金(F2017203109), 4万, 主持;
- 2015.01-2017.12, 复杂海洋环境下水下异构多自治机器人系统的协调控制, 国家自然科学基金青年基金(61403334), 26万, 主持;
- 2016.01-2017.12, 通信受限的多AUV系统编队控制研究, 中国博士后科学基金(2015M581318), 5万, 主持;
- 2015.06-2016.12, 水声通信限制下的异构水下机器人协调控制研究, 人社部留学人员科技活动项目, 3万, 主持;
- 2017.09-2020.08, Grey-Box Modeling and Plant-Wide Control in Water Treatment for Offshore Oil & Gas Production, 丹麦烃技术研究中心DHRTC项目(878041), 190万元丹麦克朗, 参与。

三、取得的科研成果

- Xinquan Zheng, Shaobao Li, Xiaoyuan Luo, Yuyan Zhang, Xiaolei Li, Xinping Guan. Fast Distributed Platooning of Connected Vehicular Systems with Inaccurate Velocity Measurement. IEEE Transactions on Systems, Man, and Cybernetics: Systems, 2023, 53(10): 5996-6006.
- Mengjie Li, Shaobao Li, Xiaoyuan Luo, Xinquan Zheng, Xinping Guan. Distributed periodic event-triggered terminal sliding mode control for vehicular platoon system. Science China-Information Sciences, 2023, 66(12).
- Ge Wen, Shaobao Li*, Fucui Liu, Xiaoyuan Luo, Mengjoo Er, Mufti Mahmud, Tao Wu. MYOLOv5s-CA: A Modified YOLOv5s Network with Coordinate Attention for Underwater Target Detection, Sensors, 2023, 23(7): 3367.
- Shaobao Li, Feng Wang, Meng Joo Er, et al. Approximate Output Regulation of Discrete-Time Stochastic Multiagent Systems Subject to Heterogeneous and Unknown Dynamics. IEEE Transactions on Systems, Man, and Cybernetics: Systems, 2022, 52(10): 6373-6382.
- Shaobao Li, Petar Durdevic, and Zhenyu Yang, Trajectory Tracking of Underactuated VTOL Aerial Vehicles with Unknown System Parameters via IRL, IEEE Transactions on Automatic Control, 2022, 67(6): 3043-3050.
- Xiaoyuan Luo*, Yuliang Fu, Xiaolei Li, Shaobao Li. Dynamic event-based resilient consensus of networked Lagrangian systems under DoS attacks, Journal of the Franklin Institute, 2022, 360(12): 9198-9215.
- Shaobao Li, Petar Durdevic, and Zhenyu Yang, Model-free H^∞ tracking control for de-oiling hydrocyclone systems via off-policy reinforcement learning, Automatica, 2021, 133: 109862.
- Shaobao Li, Meng Joo Er, and Jie Zhang. Distributed Adaptive Fuzzy Control for Output Consensus of Heterogeneous Stochastic Nonlinear Multi-Agent Systems, IEEE Transactions on Fuzzy Systems, 26(3), 2018: 1138—1152.
- Shaobao Li, Jie Zhang, Xiaolei Li, Feng Wang, Xiaoyuan Luo, Xinping Guan. Formation control of heterogeneous discrete-time nonlinear multi-agent systems with uncertainties, IEEE Transactions on Industrial Electronics, 64(6), 2017: 4730—4740.
- Shaobao Li, Gang Feng, Xiaoyuan Luo, Xinping Guan. Output Consensus of Heterogeneous Linear Discrete-time Multi-Agent Systems with Structural Uncertainty. IEEE Transactions on Cybernetics, 45(12), 2015: 2868—2879.
- Yuguang Zhang, Shaobao Li, Xiaoyuan Luo, Q-Learning Control for Robust H^∞ Tracking of De-Oiling Hydrocyclone Systems, International Conference on Intelligent Autonomous Systems, 2023.
- Shaobao Li, Yuxiang Wang, Xiaoyuan Luo. Robust H^∞ Output Regulation of Nonlinear Systems, International Conference on Intelligent Autonomous Systems, 2023.
- Shaobao Li, Siming Wang, Xiaoyuan Luo. Depth Control of Autonomous Underwater Vehicles Based on Constrained Model Predictive Control, Chinese Control Conference (CCC), 2023: 2707-2712.
- Xiaoyuan Luo, Ruoyu Cao, Shaobao Li, Xinquan Zheng. Event-Triggered Integral Sliding Mode Control for Cooperative Cruise of Connected Vehicles. Chinese Control Conference (CCC), 2023: 6551-6556.
- Yanyan Fan, Zhenlin Jin, Xiaoyuan Luo*, Shaobao Li, Baosu Guo. Path-Guided Finite-Time Formation Control of Nonholonomic Mobile Robots Based on an Extended State Observer, Applied Sciences 12 (18), 2022: 9281.
- Petar Durdevic, Shaobao Li, Daniel Arroyo, Zhenyu Yang. Design, Modelling and Control of an Amphibious Quad-Rotor for Pipeline Inspection, Mechatronics, 12, 2022.
- Ge Wen, Fucui Liu, Xiaoyuan Luo, Shaobao Li. Underwater Target Detection Based on Modified YOLOv5, the 5th International Conference on Intelligent Autonomous Systems, 2022: 7-12.
- Yanyan Fan, Zhenlin Jin, Xiaoyuan Luo, Shaobao Li, Xiaolei Li*, and Jianmei Wang. Output Feedback-based Finite-time Containment Control of Mobile Robots. Chinese Control Conference (CCC), 2022: 4583-4588.
- Bohua Wang, Meng Joo Er, Zhongkun Li, Shaobao Li. A Novel Maximum Energy Extraction and Tracking Strategy for Wave Energy, International Conference on Intelligent Autonomous Systems (ICoIAS), 2021: 271-276.
- Hao Wu, Shaobao Li, Petar Durdevic, Zhenyu Yang. Game Theoretical Reinforcement Learning for Robust H^∞ Tracking Control of Discrete-Time Linear Systems with Unknown Dynamics, International Conference on Intelligent Autonomous Systems, 2021: 290-295.
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- 罗小元, 陈甜, 李绍宝, 郑心泉. 基于深度强化学习策略的带约束的混合车辆编队控制方法, 公布号: CN116382297A, 2023.07.04, 专利。
- 刘福才, 温个, 李绍宝. 一种基于YOLOv5的水下目标检测方法, 公布号: CN115984681A, 2023.04.18, 专利。
- 刘福才, 赵悦, 李绍宝. 基于强化学习的油水分离系统容错H无穷跟踪控制方法, 公布号: CN115903515A, 2023.04.04 专利。

四、联系方式

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