

As an important branch of machine learning, reinforcement learning (RL) has proved its efficiency in many emerging applications in science and engineering. A remarkable advantage of RL is that it enables agents to maximize their cumulative rewards through online exploration and interactions with unknown (or partially unknown) and uncertain environment, which is regarded as a variant of data-driven adaptive optimal control method. However, the successful implementation of RL based control systems usually relies on good quantity of online data due to its data-driven nature. Therefore, it is imperative to develop *data-efficient RL* methods for control systems to reduce the required number of interactions with external environment. Moreover, network-aware issues, such as cyberattacks, dropout packet and communication latency, and actuator and sensor faults, are challenging conundrums that threaten the safety, security, stability, and reliability of network control systems. Consequently, it is significant to develop *resilient RL* mechanisms when the online data quality is affected by network-aware issues. This special issue focuses on promoting the development of cutting-edge RL and network control systems, including theoretic studies, controller design, algorithm development, applications, and experimental validations. This special issue will encourage the collaboration between researchers from diverse fields such as computational intelligence, control systems, RL and cybersecurity.

### Scope of the Special Issue

We invite submissions on all topics of RL Based Control with Data-Efficient and Resilient Methods, including but not limited to:

- Data-efficient RL for dynamical systems
- RL and output regulation problems
- RL and control systems with deception attacks
- RL and control systems with dropout packet and communication latency
- RL and control systems with sensor-actuator faults
- RL for systems with human-in-the-loop
- Robust adaptive dynamic programming
- Data-efficient RL and cooperative control for multi-agent systems
- Data-efficient output regulation problems with cyberattacks
- Data-efficient RL and game theory
- Resilient RL for network systems
- Data-efficient RL for infinite-dimension systems
- Integration of deep neural networks, actor-critic approaches and/or other computational intelligence approximators
- RL and control systems with denial-of-service attacks

### Timeline

- Apr.1, 2022: Deadline for manuscript submission
- Jul. 1, 2022: Reviewer's comments to authors
- Oct. 1, 2022: Submission deadline of revisions
- Dec. 1, 2022: Final decisions to authors

### Guest Editors:

- Weinan Gao, Florida Institute of Technology, USA
- Li Na, Harvard University, USA
- Kyriakos Vamvoudakis, Georgia Institute of Technology, USA
- F. Richard Yu, Carleton University, Canada
- Zhong-Ping Jiang, New York University, USA

### Submission Instructions:

- Read the Information for Authors at <http://cis.ieee.org/tnnls>
- Submit your manuscript at the TNNLS webpage (<http://mc.manuscriptcentral.com/tnnls>) and follow the submission procedure. Include the following instructions in the header of the first page of your manuscript and cover letter: 'Please submit the manuscript to the Special Issue on Reinforcement Learning Based Control: Data-Efficient and Resilient Methods'.