

## IEEE Control Systems Letters (L-CSS)

### Call for submissions to L-CSS Special Issue: "Data-driven analysis and control"

The L-CSS invites submissions for a **special issue** on "**Data-driven control**" (to be included, tentatively, in the 2023 volume of L-CSS).

Authors are invited to submit **six-page** manuscripts for review on this topic. The deadline for initial submissions is: **December 10, 2022**.

Submission for the special issue will be possible starting on **November 10, 2022**.

Submission instructions can be found in the L-CSS website at

[http://ieeecsletters.dei.unipd.it/Page\\_authors.php?p=1](http://ieeecsletters.dei.unipd.it/Page_authors.php?p=1)

#### Guest Editors:

- **Kanat Camlibel**, Groningen University, The Netherlands
- **Martin Guay**, Queen's University, Canada
- **Sophie Tarbouriech**, LAAS-CNRS, Toulouse, France
- **Harry Trentelman**, Groningen University, The Netherlands

In the analysis and controller design for complex systems that combine systems of different nature like those described by ODEs, PDEs, logic elements and hybrid models, as they appear in for example the climate sciences, neural sciences, epidemiology, power and energy networks, etc., we are often faced with very imprecise or even unknown mathematical models of the dynamic evolution. Also, the models may include very high-dimensional dynamics and nonlinearities. Classical model-based methods for analysis and controller design may then turn out to be difficult or even impossible to apply. In addition, often even finding a simple mathematical model of the system may turn out to be impossible. To tackle these problems, data-driven analysis and control proposes an approach to system analysis and control design that circumvents the step of finding a mathematical model of the to-be-controlled complex system. This alternative approach deals with designing control laws directly using only measured data.

One can of course argue that also the combination of classical system identification followed by model-based control as described above is an instance of data driven control design. Indeed, methods using this combination are often called indirect methods of data-driven control, as they consist of the two-step process of data-driven modeling (i.e., system identification) followed by model-based control. In contrast to these indirect methods, there exist direct methods that focus on directly mapping data to controllers without an intermediate step of system identification. Both paradigms have different pros and cons. For example, identification might be expensive and the obtained model may not always be useful for the intended control design problem. In comparison to the

maturity of system identification, the theory of direct data-driven control is still in its infancy.

This special issue intends to collect new ideas and contributions in the framework of data-driven control. The primary aspect of any contribution should be novelty and originality. Also, the results should be presented in a mathematical language, according to the L-CSS standard.

Specific topics of interest for this special issue include, but are not limited to:

- stability, robustness, performance issues of dynamical systems based on the use of data;
- identification, observation and approximation techniques of dynamical systems including possibly machine learning elements in the loop;
- data-driven control including learned models.

A manuscript submitted to the special issue should be **six pages long** in the journal format (style files are available on [PaperPlaza](#)), which is a strict limit. The contribution may also be accompanied by **supplementary material** (up to 9 additional pages are possible). However, according to the journal policy, **the value of the submission shall be decided based only on the main paper**, which must be self-contained, namely, the results can be understood and checked without reading the supplement.

The supplement is intended to present complementary information, such as simulations, videos, figures, or examples, but not, for instance, theorem proofs or definitions. Some mathematical background can be added to the supplement, for the reader's convenience, if it is already existing in the literature. However, crucial new derivations must be in the main paper.

The manuscripts will be peer-reviewed by international experts. According to the L-CSS policy, the final decision will be made within two rounds of reviewing with no exceptions. The final decision will be reached no later than 5 months from the initial submission deadline.

Important dates

**Submission deadline:** December 10, 2022.

**(Accepted) Papers online publication:** within one week from the submission of the final manuscript and in any case no later than 6 months after initial submission.