Processes
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Section
Process Control, Modeling and Optimization



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Section Information

The Process Control, Modeling and Optimization section of *Processes* welcomes high-quality manuscripts concerning control and monitoring methodologies, including related topics such as simulation, modeling, identification, and optimization, for solving problems related to process systems engineering. This section encourages submissions focusing on novel methodologies and their analysis, including applications using novel and existing methodologies.

All submissions in this section should relate directly to process systems engineering, within the aims and scope of the journal Processes (chemistry, biology, materials, and allied engineering fields). Contributions that are purely computational in nature without a clear relationship to the aims and scope of this section will not be accepted. To facilitate the rapid, open exchange of knowledge, all authors are strongly encouraged (but not required) to submit any associated source code, models, simulations, software, and data, either as supplementary material and/or to an open-access repository such as LAPSE (the Living Archive for Process Systems Engineering).

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A first decision is provided to authors approximately 14.9 days after submission; acceptance to publication is undertaken in 2.9 days (median values for papers published in this journal in the second half of 2025)

Section Process Control, Modeling and Optimization

Process Modeling

- Physics-informed (first principle) modeling.
- Data-driven modeling.
- Numerical methods.
- Equation-system solving algorithms and heuristics.
- Initialization problems.
- Solution strategies.
- Multi-scale modeling approaches .
- Problem formulation strategies.

Process Data-Based Approaches

- Multivariate analysis.
- Principal component analysis.
- Big data methods.
- Artificial intelligence.
- Machine learning.
- Industry 4.0-related.

Model Identification

- Model identification.
- Model reduction.
- State–space sampling techniques.
- Design of experiments.
- Model fitting.

Process Control

- Advanced control algorithms.
- Closed-loop performance monitoring.
- Hierarchical control.
- Non-centralized control.
- Robustness in control.
- Optimization-based control.

Process Supervision

- Decision support systems.
- Uncertainty and risk.
- Process monitoring.
- Fault diagnosis.
- Fault-tolerant control.
- Sensor placement.

Process Optimization

- Mathematical programming.
- Heuristic-based algorithms.
- Stochastic algorithms.
- Evolutionary algorithms.
- Derivative-free optimization.
- General optimization theory.
- Computational complexity.
- Related numerical methods.

Process Intensification

- New technologies for process intensification.
- Knowledge-based methods.
- Optimization-based methods.
- Hybrid methods.
- Operability, controllability, and safety.

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