

Special Issue on Foundations and Applications of Process-based Modeling of Complex Systems

CALL FOR PAPERS

Process-based modeling is an alternative modeling framework for complex systems. In contrast to agent-based models, cellular automata, and other mainstream languages in complex systems, in a process-based model the structural features of a system are encoded in the interactions between the entities, rather than in the entities themselves. The latter change in perspective has been shown to strongly reduce the computing power required for analytic work and simulations on large-scale systems.

Examples of process-based languages include reaction networks, Petri nets, and coalgebras. It is well known that they have numerous applications in systems biology; however little has been said about the potential of process-based models in other areas, where their application is straightforward, such as economics, ecology, and social science. Moreover, fundamental questions regarding the appropriate way to define structural properties such as resilience, robustness, and diversity, as well as the relation between process-based models and other modeling languages, remain to be clarified.

This special issue aims to collect original research and review articles that either elaborate foundational aspects related to mathematical, algorithmic, or structural notions relevant to process-based frameworks or provide relevant applications in complex systems.

Potential topics include but are not limited to the following:

- ▶ Building models in relevant application areas of complex systems
- ▶ Defining and computing structural properties (resilience, robustness, emergence, etc.)
- ▶ Performing dynamical analysis (stability, criticality, and self-organization) of complex systems
- ▶ Comparing process-based models with other modeling alternatives such as agent-based models or standard network models
- ▶ Extending current process-based modeling frameworks to incorporate novel features
- ▶ Assessing the potential of process-based models to handle fundamental issues related to complexity such as climate change, ecological stability, and economic crises

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/complexity/pmsm/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

Lead Guest Editor

Francis Heylighen, Vrije Universiteit
Brussel, Brussels, Belgium
fheyligh@vub.ac.be

Guest Editors

Peter Dittrich,
Friedrich-Schiller-University, Jena,
Germany
peter.dittrich@uni-jena.de

Tomas Veloz, Foundation for the
Interdisciplinary Development of
Science, Art and Technology, Santiago,
Chile
tveloz@gmail.com

Submission Deadline

Friday, 10 July 2020

Publication Date

November 2020