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Open Invited Track on
Data-driven modeling and learning in dynamic networks

Paul M.J. Van den Hof, Eindhoven University of Technology
Alessandro Chiuso, University of Padova
Jorge Goncalves, University of Luxembourg

With the growing spatial complexity of engineering systems, e.g., in power networks, transportation networks and industrial production systems, as well as in systems biology and neurosciences, there is a strong need for effective modelling tools for dynamic networks, being considered as interconnected dynamic systems, that operate over a spatial topology or graph. Both in system identification and in machine learning, methods are currently being developed to provide data-driven tools for modeling and learning in systems that are structurally interconnected in dynamic networks. The modeling and learning aspects include estimation of dynamics as well as the interconnection structure (topology) and cause-effect relationships in graphical models. This includes questions of modeling, representations, analysis and model reduction of dynamic networks and graphical models, as well as aspects of distributed computational resources, as e.g. in distributed estimation, modeling and control.

We solicit contributions both in theory, new methods and algorithms, as well as in applications.

Particular subjects of interest are:

- Local module identification
- Machine learning in structured systems
- Network identifiability
- Sparse topology estimation
- Experiment design and signal allocation
- Physical networks and network analysis
- Model reduction in networks
- Fundamental representations of networks
- Identification of graphical models
- Security aspects in networks
- Fault detection and diagnosis in networks
- Scalable algorithms
- Data-driven multi-agent and distributed control
- Distributed estimation and identification
- Heterogeneous data
- Hybrid networks
- Inference of causal relationships, Granger causality

Applications may include:

- Power grids
- Biological and gene regulatory networks
- Brain networks, neuroscience
- Large scale systems in process control
- Infrastructural systems,
- Smart buildings
- Robotic networks
- Transportation networks

More information: https://www.sysdynet.eu/ifac2020-open-invited-track/
p.m.j.vandenhof@tue.nl