Smart Manufacturing Lab

Harz University of Applied Sciences

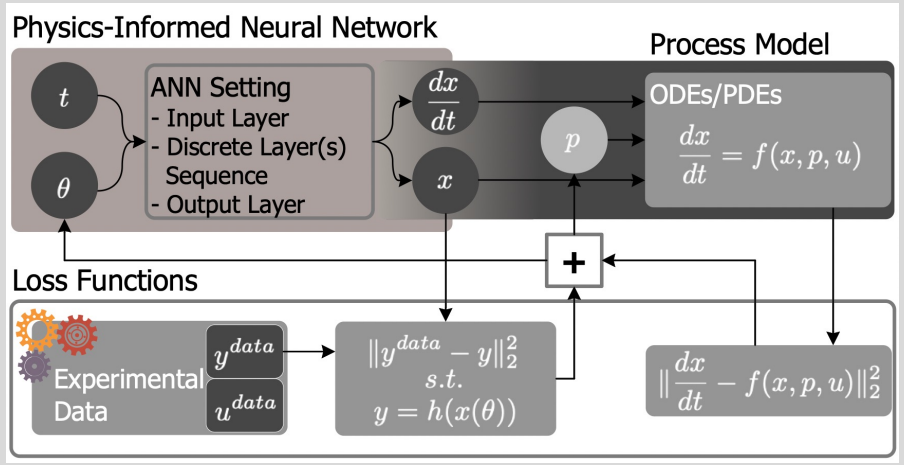
▲ Hochschule Harz
Hochschule für angewandte Wissenschaften

Smart Data for Physics-Informed Machine Learning

(Master thesis / Bachelor thesis)

Hybrid process modeling for efficient and rapid deployment of digital twin concepts in Industry 4.0 calls for smart data. Thus, the focus of this study is the adaptation and evaluation of a model-based **Design of Experiment** (MBDoE) concept for **physics-informed neural networks** (PINNs). Specific tasks that could be included:

- Explore the potential benefits and limitations of using MBDoE strategies for PINN-based parameter & hidden states identification (i.e., soft sensors).
- Develop and test a PINN-based MBDoE strategy for a specific application in Industry 4.0, using both simulated and real-world data of a partial differential equation system (e.g., dynamic systems in process systems engineering).
- Compare the performance of the PINN-based MBDoE to conventional DoE concepts in terms of accuracy, efficiency, and interpretability.



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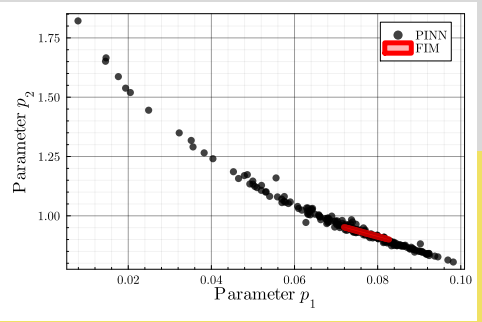

Requirements

Interested in:

- Machine learning / deep learning
- System identification / systems theory
- Optimization / process systems engineering

Programming skills are advantageous (Julia, Python, etc.)

Contact

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