# Control of a Partial Differential Equation System Using Physics-informed Neural Networks

TECHNISCHE UNIVERSITÄT DARMSTADT

## Master's Thesis

Partial differential equations (PDEs) are commonly encountered in fluid dynamics and engineering. Solving PDEs numerically, e.g., with the finite volume method, can be challenging.

Physics-informed neural networks (PINNs) are capable of describing the dynamic evolution of PDE systems. They incorporate prior knowledge of physical laws during the training phase, improving their generalization even when only a low amount of training data is available.

Your tasks will be:

1. Literature review on PDEs and physics-informed training of neural networks
2. Implementation of physics-informed training for PDEs in HILO-MPC[1]
3. Study neural networks trained with the newly implemented method in a control strategy

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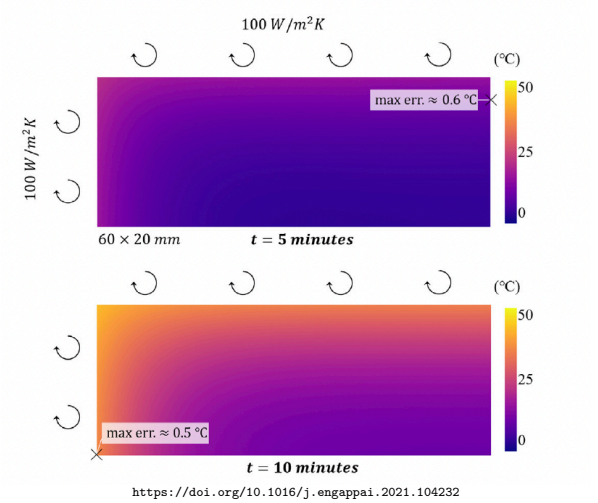
| Experience with / knowledge about: | Modelling, artificial neural networks, model predictive control |
| Programming skills: | Python (good to very good skills required) |
| Language: | English (thesis and presentation), German |



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[1] https://www.ccps.tu-darmstadt.de/research_ccps/hilo_mpc/index.en.jsp

CCPS Control and Cyber-Physical Systems