Physics-informed neural networks for the prediction of geometric features in Additive Manufacturing

Current state
Wire- and arc-based additive manufacturing (WAAM) is an innovative additive process that is experiencing growing economic interest, especially due to high deposition rates. To open up further areas of application, an efficient determination of geometric quantities as a function of the production parameters is required.

Objective
Thus, in this project, a physics-informed neural network is developed, which can utilize physical knowledge about the WAAM-process and enhance the information content of the available data. This thesis aims to extract knowledge from experimental data using physics-informed machine learning. Based on a literature research into PINNs promising neural network architectures will be implemented. The implemented neural network will be validated with experimental data, which is collected with the WAAM-setup at the iwb.

Qualification profile
- Motivation and initiative
- Good Python programming
- Interest in machine learning (especially physics-based)

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