Chair of Computational Modeling and Simulation
TUM Deparment of Civil, Geo and Environmental Engineering
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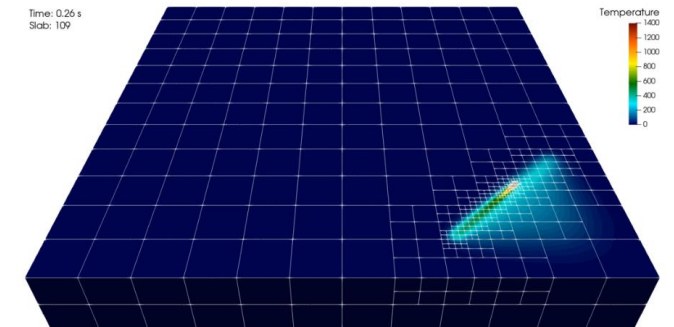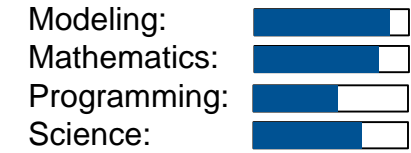# Surrogate model for single layer simulation of Selective Laser Melting (SLM)

Project Characteristics

Modeling:
Mathematics:
Programming:
Science:

Task

With the single-layer high-fideltiy FEM simulation results (temperature field) for different laser scan strategies, a surrogate model using Neural network, POD and SINDy have to be developed/explored.

Temperature fields to train the model will be provided. Following are the estimated tasks

➢ Data analysis of the temperature fields

➢ Develop, train a neural network (possibly CNN) and and analyse its accuracy in predicting accurate temperature values for different spatial , temporal and laser scanning data

➢ Study and apply Proper orthogonal decomposition on the temperature fields-snapshots and analyse its accuracy

➢ Explore the possibility of discovering the PDE out of the given temperature field dataset

High-fidelity FEM simulation of SLM

1. Paul, Arindam, et al. "A real-time iterative machine learning approach for temperature profile prediction in additive manufacturing processes." *2019 IEEE International Conference on Data Science and Advanced Analytics (DSAA)*. IEEE, 2019.
2. de Gooijer, Boukje M., et al. "Evaluation of POD based surrogate models of fields resulting from nonlinear FEM simulations." *Advanced Modeling and Simulation in Engineering Sciences* 8.1 (2021): 1-33.