deRSE25 and SE25 Timetables



Contribution ID: 131

Type: Talk (15min + 5min)

OpenLB : On the Software Architecture of an Efficient and Flexible Lattice Boltzmann Method Framework

Tuesday 25 February 2025 16:40 (20 minutes)

OpenLB is one of the leading open source software projects for Lattice Boltzmann Method (LBM) based simulations in computational fluid dynamics and beyond. Developed since 2007 by an international and interdisciplinary community, it not only provides a flexible framework for implementing novel LBM schemes but also contains a large collection of academic and advanced engineering examples. It runs efficiently on target platforms ranging from smartphones over multi-GPU workstations up to supercomputers.

This talk will give an overview of the current software architecture of OpenLB with a special focus on automatic code generation and performance engineering. Recent performance benchmarks and large-scale applications will be showcased.

Specifically, the utilization of long-time investments in ensuring the full differentiability via automatic differentiation (AD) for automatic common subexpression elimination (CSE), user-friendly model introspection and generation of adjoint simulation setups will be discussed. The talk can be viewed as a direct continuation of the author's talk at deRSE23 on the refactoring journey towards state-of-the-art-performance.

I want to participate in the youngRSE prize

no

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Session Classification: Domain Specific Languages

Track Classification: Research Software: domain-specific languages