Optimization and Biomechanics for Human Centred Robotics
KIT BioRobotics Lab

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Endowed Chair by Hector Foundation II
Institute for Anthropomatics and Robotics (IAR)

Bachelor's or Master's Thesis: Numerical schemes on modern accellerator architectures

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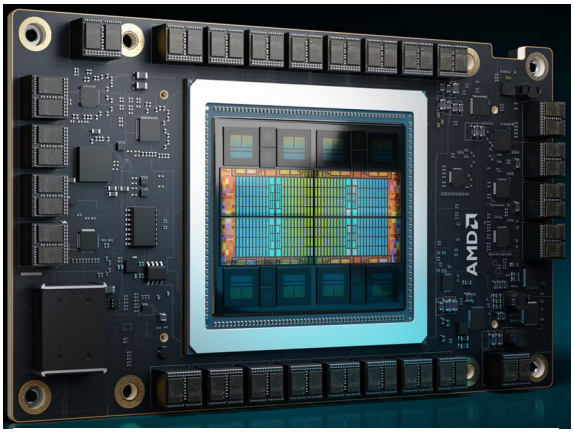
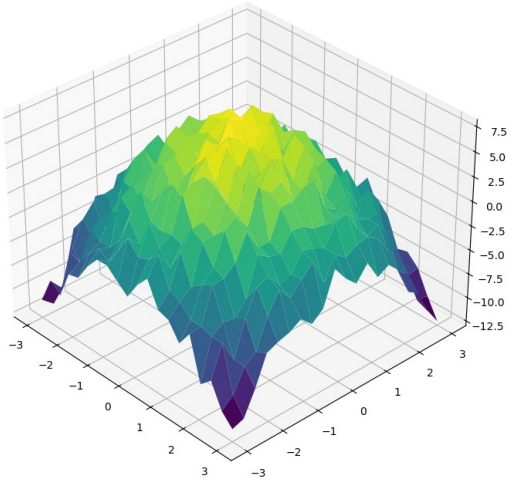
Background



Numerical methods are a core pillar of modern robotics research. This includes both Reinforcement Learning approaches as well as traditional Optimal Control approaches, both of which are internally based on optimization methods. The faster the optimization, the faster the methods based on it, the more efficient and effective the robot control and motion generation. Hence, it comes naturally to try to exploit emerging computing architectures to leverage them for the purpose of accellerating those respective methods.

Scope of the thesis



This thesis will focus on the evaluation of different numerical/optimization schemes on shared-memory architectures, with an emphasis on benchmarking and identification of bottlenecks. We want to identify the specific advantages and limitations of a shared memory architecture as well as the capabilities for accellerator offloading for robotics-related problems and beyond.
The exact scope of the thesis depends on whether it is layed out as a Bachelor's or a Master's thesis.

Recommended knowledge

- fundamental knowledge about mathematical or numerical methods
- C++ programming experience