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:
Resilience of biped robots to sudden force on endeffectors

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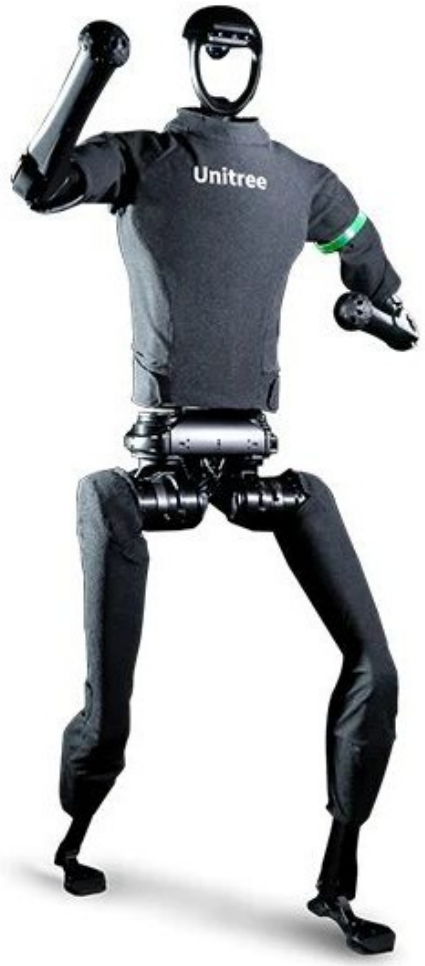
Background

Bipedal robotic platforms pose unique challenges to balancing and self-stabilization. Many approaches have been proposed, but many aspects are still open research questions. In particular, sudden force impacts or disturbances can produce a significant challenge to the self-stabilization capabilities of such a platform.



Scope of the thesis

In this thesis, we will focus on a sudden force impact on one of the end effectors. We will primarily look at approaches of how to statically and dynamically stabilize the platform in case of expected, but sudden force impacts, as well as possibly looking on how this can be extended to unexpected force impacts.
The developed strategies are investigated in terms of their limitations, i.e. how much of a force they can absorb before terminal destabilization with upper-body ground contact relocation (i.e. falling) occurs.

Recommended knowledge

- experience in Gazebo or similar simulation environments
- Familiarity with ROS or a similar platform
- General familiarity with robotics, for example
- programming experience