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:
On the Importance of Style: The Superhero Landing

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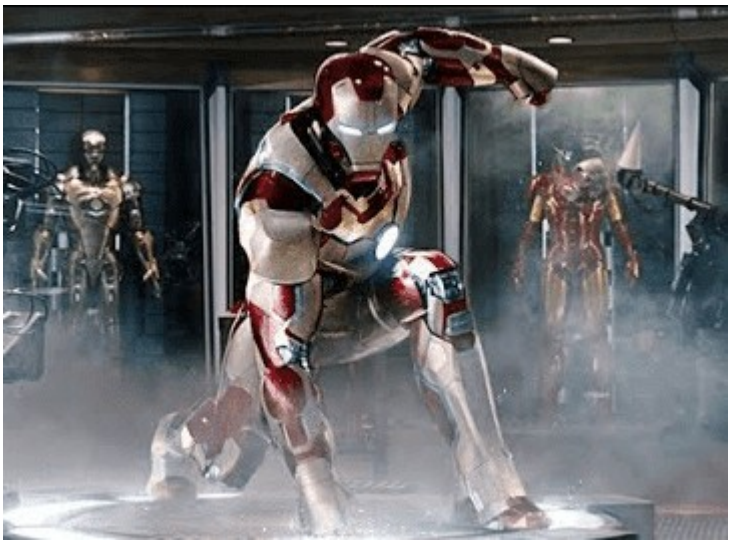
Background

Public relations are an important topic not only in PR, but also in the business of disaster relief/being a superhero. Hence, an impactful demeanor is advantageous, such as a high-impact/high-impression arrival on site. However, during arrival, damage to the wearer should be minimized, because no PR can mitigate a superhero who will not be able to do anything due to severe injury on crash landing. Hence, it is paramount to combine a high-impact/high-impression arrival with minimal injury to the wearer of a potential flying exoskeleton.



Scope of the thesis

Students will investigate the impact and effects of a superhero landing in a full-body exoskeleton onto the user. Different approaches for a high-impact landing with minimal carnage to the wearer will be investigated and optimized. Optimal approaches will be compared in terms of tradeoffs and effects. Investigations of strategies to minimize descent while maximizing flashyness can be explored. Project can either be investigated by modelling with explicit numerical optimal control including an explicit investigation of effects or alternatively a interpolated policy via reinforcement learning and afterwards a characterization of said policy and an investigation towards its underlying mechanisms and effects.

Recommended knowledge

- experience in Numerical Optimal Control or Reinforcement Learning
- Robotics knowledge, such as Robotics 1 or human modelling
- programming experience