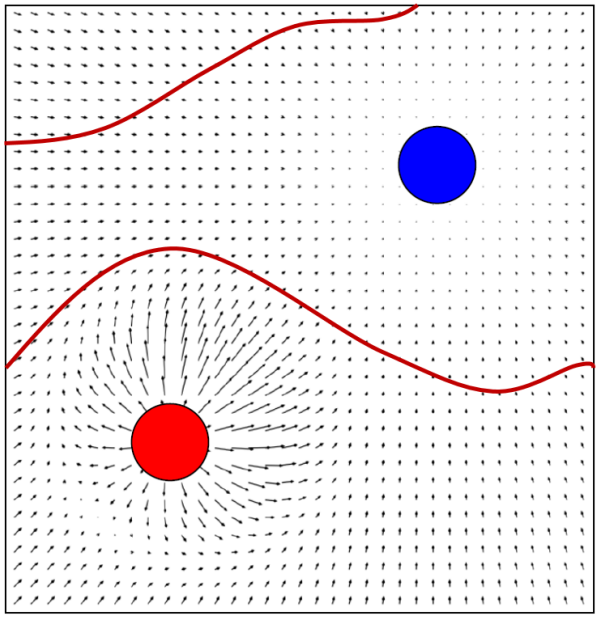
Institut für Regelungstechnik
Leibniz Universität Hannover

Leibniz Universität Hannover

Bachelor-/Masterthesis

Guarantees for Motion Planning Algorithms

Enabling robots to safely interact with humans is an essential goal of robotics research. The developments achieved over the last years in mechanical design and control made it possible to have active cooperation between humans and robots in rather complex situations. In these terms, safe behavior of the robot even under worst-case situations is crucial. State-of-the-art collaborative robots mainly depend on collision detection mechanisms to ensure safety because few sophisticated motion planning algorithms are able to give theoretical guarantees for obstacle avoidance.
Therefore, our theoretical analyses of the motion planning algorithms focusses on mathematical proofs for obstacle avoidance with only few and resonable constraints. Nevertheless, the analyses is not limited to this topic but also includes e.g. goal convergence and performance criteria. These analyses in turn provide important insights into the underlying algorithms which can be used to further improve and extend the motion planner.



Possible research in this field includes the theoretical analyses of motion planning approaches; the adaption, extension and testing of these algorithms as well as the simulation in static and dynamic 2D and 3D environments.

Requirements: Strong theoretical foundations in mathematics and control theory.

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