

Master Graduation Project

Whole-Body Motion Planning of Legged Robots

Project Description

Legged robots are promising for tasks in construction, defense, and disaster responses due to their excellent mobility in complex environments. The advantage of legged robots over wheeled robots is to provide improved mobility over rough terrain by exploiting articulated legs. However, this advantage is realized at the cost of a significant increase in the complexity of controlling legged robots.



Figure 1 MIT Cheetah 3



Figure 2 ANYmal developed by ETH Zurich

The difficulties in controlling legged robots include the hybrid nature of their multi-contact dynamics, the need for the real-time generation of complex motion trajectories, and the handling of various system constraints. In this student project, the challenge is to design an efficient motion planning algorithm to achieve complex control tasks, e.g., climbing stairs or backflip. The algorithm should take into account the hybrid nature of system dynamics. The efficiency of the algorithm will be validated in a simulation platform.

Project Application

Experiences in the following aspects are preferred but not strictly required:

1. Systems and control: Hybrid systems, model predictive control
2. C++ or/and Python
3. Experience in robotics and simulation, e.g., Robot Operating System and Gazebo

Contact

If you are interested in this project, please contact me via the following email:

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