RUNNING DYNAMICS OF QUADRUPED ROBOTS

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Background

Mobile robots are important for many applications, such as space exploration, search and rescue, military service, especially in dangerous environments for human. Legged mobile robots have the capability to navigate through rugged terrains. They also belong to the bio-inspired robotic systems. One main disadvantage of legged robots, as compared to mobile robots, is the slow speeds. This drawback is considerably seen as the cause of the impracticality of multi-legged robots in field uses. Hence historically there have been more developments in wheeled robots and great quantities of these types of units are currently in active service across various capacities. Now, there are significant quests for faster quadrupeds capable of high speed gaits such as galloping. Most of the previous works are restricted to planar modelling of running motions like quick trot, pace, pronk and bound, and ignores the sideways movement of the robots.

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Project

In this project, the dynamics of a quadruped robot will be analysed from a new point of view. Constraint forces will play an important role in the development of the dynamic model and also motion control. Simulations based on the optimal control should be conducted at the end of the project. Furthermore, the research outcomes should suggest an optimum design of a quadruped robot for the further developments.

Big Dog (picture from Boston Dynamics)

About lab

The laboratory for motion generation and analysis (LMGA) is directed by Dr Chen. We are interested in innovative motion generation for versatile edge-cutting applications, and conducting fundamental researches on motion analysis. The research team is consisted of research assistants, post-graduates, visiting scholars, and distinct undergraduates. The lab receives funds from the Australian Research Council (ARC), and multiple internal grant bodies. We have strong national and international collaborations. If interested, you are welcome to contact Dr Chen for more information.