CE554 Progress Report (1 page report)

Team 02

2018/11/28

**This week progress:**

1. We performed ‘push recovery’ experiments that a quadruped robot pushed by a collision robot in simulation. We verified that the quadruped robot can withstand push force up to 8.6 [N/kg] in those experiments, and we will continue to test the push recovery performance with more harsh push forces.
2. We performed ‘walking over unperceived uneven terrain’ experiments. The maximum obstacle height used in those experiments was set to 10 [%] of the usable leg length of the quadruped robot. Nevertheless, we will set the maximum obstacle height up to 30 [%] of the usable leg length, which is the condition proposed in the rebuttal game plan.

**Issue:**

1. The push recovery performance of the quadruped robot was degraded when the contact constraints were not included in the optimization formulation. We will include the results in the paper.
2. In addition to push recovery experiment, we found that foot slippage frequently occurred in stance foot (foot contact with the ground) when the robot walked over unperceived uneven terrain without the contact constraints.

So we can conclude that using full optimization variables can consider the contact constraints explicitly in the optimization formulation, which is one of critical elements to enable the robot perform robust locomotion over challenging terrain.