

Robust Simulation and Trajectory Optimization for Humanoids

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The DARPA Robotics Challenge and other recent efforts in humanoid and legged robots have emphasized the need for reliable software for handling the complex dynamics of locomotion and manipulation. This talk will describe two software tools recently developed by my lab: the first is a robust physics simulation method that easily handles intimate contact between non-convex meshes, and the second is a robust time-scaling method for generating dynamic trajectories under contact. The reliability and versatility of these tools is demonstrated on simulated versions of Hubo, DRC-Hubo, Atlas, PR2, and industrial robots performing a variety of rough terrain and manipulation tasks. The Klamp't simulator and MInToS trajectory optimizer can be obtained at <http://klampt.org> and <http://motion.pratt.duke.edu/mintos/>, respectively.