Optimization Model for Planning Precision Grasps with Multi-Fingered Hands

Welcome to this page. This page supplements our IROS2019 paper submission, in which we present an optimization model to plan precision grasps with multi-fingered hands.

Grasp planning for multi-fingered hands is challenging due to the high-dimensionality, collision and sensing/actuation uncertainties. We propose an optimization model to solve the grasp planning problem. The optimization considers several geometric related qualities and collisions, and is relaxed with the proposed optimization modeling method. The relaxed optimization is solved by the proposed iterative PPO-JPO. PPO stands for the palm pose optimization while JPO stands for the joint position optimization. The proposed optimization model is able to locate collision-free optimal precision grasps efficiently. The average computation time is 0.50 sec/grasp. The searching is robust to the incompleteness and noise of the point cloud.

Video included:

1. VREP demo of the iterative PPO-JPO.
2. Precision grasp and power grasp comparison.
3. GTO demo. Use bunny object, explain the three cases.
4. Experiment Results.
5. Summarize the points.