

Pybullet Simulator

Info

- **Due date:** TBD
- **Presentation date:** TBD, ~10 min
- You must submit the full code and ppt file to PLMS.
- Please demonstrate the simulator during your presentation.

Task

- **Generate circular trajectory**
 - Arbitrary center, radius, position and orientation.
 - Tracking time : T (It means you need to tracking path with arbitrary constant velocity)
- **Null motion**
 - Joint limit avoidance
 - Manipulability maximization
 - Potential function minimization: $\sqrt{\dot{q}_1^2 + \dots + \dot{q}_n^2}$
- **Plotting**
 - $q, \dot{q} \in \mathbb{R}^{n \times 1}, p = (x, y, z), \dot{p} = (\dot{x}, \dot{y}, \dot{z})$
 - Euler angle $(\phi, \theta, \psi), (\dot{\phi}, \dot{\theta}, \dot{\psi})$
 - Manipulability μ , potential, etc...
 - Tracking error
- **You also need to compute the following terms at every time steps**
 - Jacobian, Null space of Jacobian (in both of space/body frame)
 - Twist(V_{sb}^s & V_{sb}^b) and Adjoint matrix($Ad_{g_{sb}}$)
 - Forward kinematics ($T_{sb} = FK(q)$)

Extra Credit! (Except any out of scopes such as dynamics and control)

- Interesting tasks
- Interesting null motions
- Higher dof manipulator
- Etc...