Modeling and Control of Manipulators
Exercise 2 - Kinematics

University of Genoa - November 30, 2018

1 Lab Steps

In this exercise we will define all the necessary functions to evaluate the manipulator Jacobian and then implement a simple Closed Loop Inverse Kinematics (CLIK) control.

1. Implement the `GetJacobianColumn(`${}^{b}_{ei}T$, ${}^{b}_{ee}T$, *jointType*`)` function, which returns the Jacobian column for a generic joint i as the stacking of J_A (angular part) and J_L (linear part), for both revolute and prismatic joint type.
2. Implement the `GetJacobian()` function which constructs and returns the whole Jacobian.
3. Define a goal transformation matrix and implement a function which evaluates the linear and angular error between the end effector and the goal. Then choose an angular gain (γ_a) and a linear gain (γ_l), and evaluate the desired end effector velocity.
4. Finally applying the inverse kinematics formula to compute the corresponding desired joint velocities.

To verify that everything is working correctly we will provide you with a very simple simulator, to check that the robot's end effector actually reaches the desired goal position.

Note: The functions developed in the last lab are needed also in this lab.

https://github.com/carlottas/MOCOMLAB2