

Home Task 3: Trajectory planning

Task:

- 1) Calculate and plot position, velocity, and acceleration trajectories of driving your robot model from configuration q_0 to configuration q_f in joint space for minimum time.
- 2) Synchronize your 6 joints to start and end motion at the same time.
- 3) Consider you have controller frequency of 120Hz.
- 4) Calculate propagated error in end-effector position (with planned trajectory for continuous time).
- 5) Redefine synchronized trajectories for numerical control.
- 6) Drive your robot model between 3 consequent points. (Solve polynomial)
- 7) Solve polynomial constraining null value for initial and final acceleration passing through 4 consequent points.
- 8) plan a straight line in cartesian space between two points. (plot goal line and actual line)
 - a. option 1: (using inverse jacobian)
you need to make sure not to pass through singularity or suggest a workaround
 - b. option 2: using sampling + inverse kinematics
the smaller the sampling size, the more fine the line

References:

You can refer to chapter 4 about trajectory planning in “1) B. Siciliano, L. Sciavicco, L. Villani, G.Oriolo, "Robotics: Modelling, Planning and Control", 3rd Edition, Springer, 2009”.

Submission:

- Show your solution in steps
- Submit your code and report in python notebook (you may reuse code from previous assignments)
- Make sure to highlight your implementation results when running the code and report