

# 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.
- 2) Synchronize your 6 joints to start and end motion at the same time.
- 3) Consider you have controller frequency of 20Hz. Calculate propagated error in end-effector position.
- 4) Redefine synchronized trajectories for numerical control.
- 5) Drive your robot model between 2 consequent points. (Solve polynomial)
- 6) Solve polynomial constraining null value for initial and final acceleration passing through 4 consequent points.

## Bonus task:

- Solve task 5 for a straight line. Which means you will need to calculate inverse kinematics on 3-4 points (position with fixing orientation) along some line and then solve trajectory.

## 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 in python/Matlab
- Write meaningful comments in your code
- Make sure to highlight your implementation results when running the code