

# 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) Redefine synchronized trajectories for numerical control
- 4) Calculate propagated error in end-effector position.
- 5) Drive your robot model between 3 consequent points. (Solve a polynomial)
- 6) Plot results of all the tasks.

## Bonus task:

- Solve tasks 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.
- Solve polynomial constraining null value for initial and final acceleration in task 1 and plot the results.

## 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
- Write meaningful comments in your code
- Make sure to highlight your implementation results when running the code
- Code:
  - o Refer to the colab skeleton [here](#).