

Tutorial– Trajectory Planning

Advanced Robotic Systems – MANU2453

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Tutorial Assignments

- **Question 1:**

- A single-link robot with a rotary joint is motionless at $\theta = -5^\circ$. It is desired to move the joint in a smooth manner to $\theta = 80^\circ$ in 4 seconds.
- Find the coefficients of a cubic which accomplishes this motion and brings the arm to rest at the goal.
- Sketch the position, velocity and acceleration of the joint as a function of time.

Tutorial Assignments

- **Question 2:**

- A single-link robot with a rotary joint is motionless at $\theta = -5^\circ$. It is desired to move the joint in a smooth manner to $\theta = 80^\circ$ in 4 seconds and also stop smoothly.
- Find the corresponding parameters of a linear trajectory with parabolic blends.
- Sketch the position, velocity and acceleration of the joint as a function of time.

Tutorial Assignments

- **Question 3:**

- We wish to move a single joint from θ_0 to θ_f starting from rest, ending at rest, in time t_f .
- The values of θ_0 to θ_f are given, but we wish to compute t_f so that the velocity never exceeds a maximum value ($\dot{\theta}$ max), and the acceleration never exceeds a maximum value ($\ddot{\theta}$ max).
- Use a single cubic segment, and give an expression for t_f and for the cubic's coefficients.

Thank you!

Have a good evening.

