ME/AER 676 Robot Modeling & Control
Spring 2023

Motion Planning Overview

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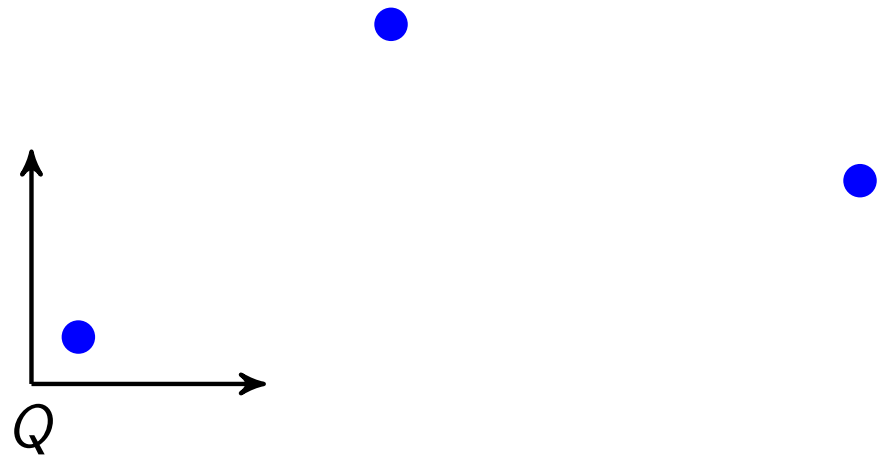
Two types:

- Path Plan
- Trajectory Plan

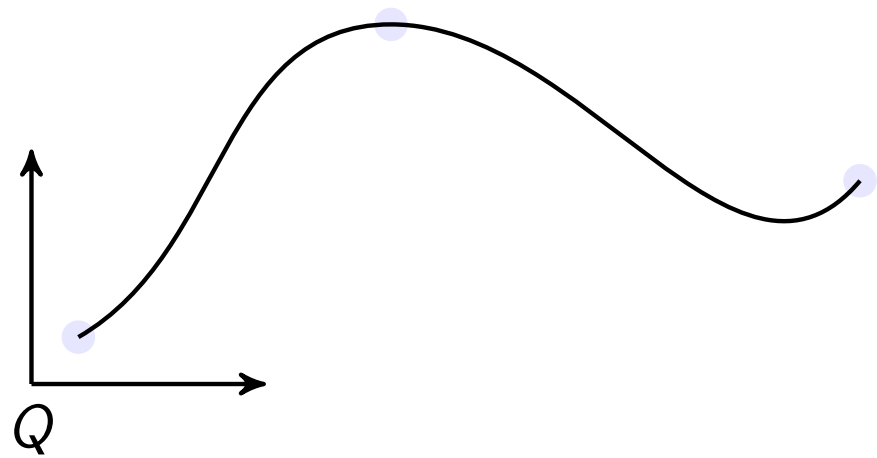
Path vs Trajectory

Discrete Path: $\mathbb{N} \to Q \subset \mathbb{R}^n$



Continuous Path: $I \to Q \subset \mathbb{R}^n$

I is an interval, $I \subseteq \mathbb{R}$



Trajectory I is a time interval

Paths and Trajectories

Definition (Discrete Path)

A path is a sequence of configurations.

Definition (Continuous Path)

A path in $\mathbb{R}^n$ is a continuous function γ from the unit interval $I = [0, 1]$ to $\mathbb{R}^n$.

Definition (Trajectory)

A trajectory $q(t)$ in $\mathbb{R}^n$ is a a continuous function q from the an interval of time $[t_0, t_f]$ to $\mathbb{R}^n$.

Some robots will execute motion described either as a path (waypoints) or a trajectory.

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  - Polynomial trajectories

Graphs

A Graph $G = (V, E)$ Consists of two lists (sets):

- Vertices V
  On the right, $V = \{1, 2, 3, 4\}$
- Edges $E \subseteq V \times V$
  On the right, $E =$
  $\{(1, 2), (1, 3), (2, 3), (2, 4), (3, 4), (4, 2)\}$