Autonomous and Mobile Robotics

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Wheeled Mobile Robots 3

Path/Trajectory Planning

companion slides for the blackboard lecture

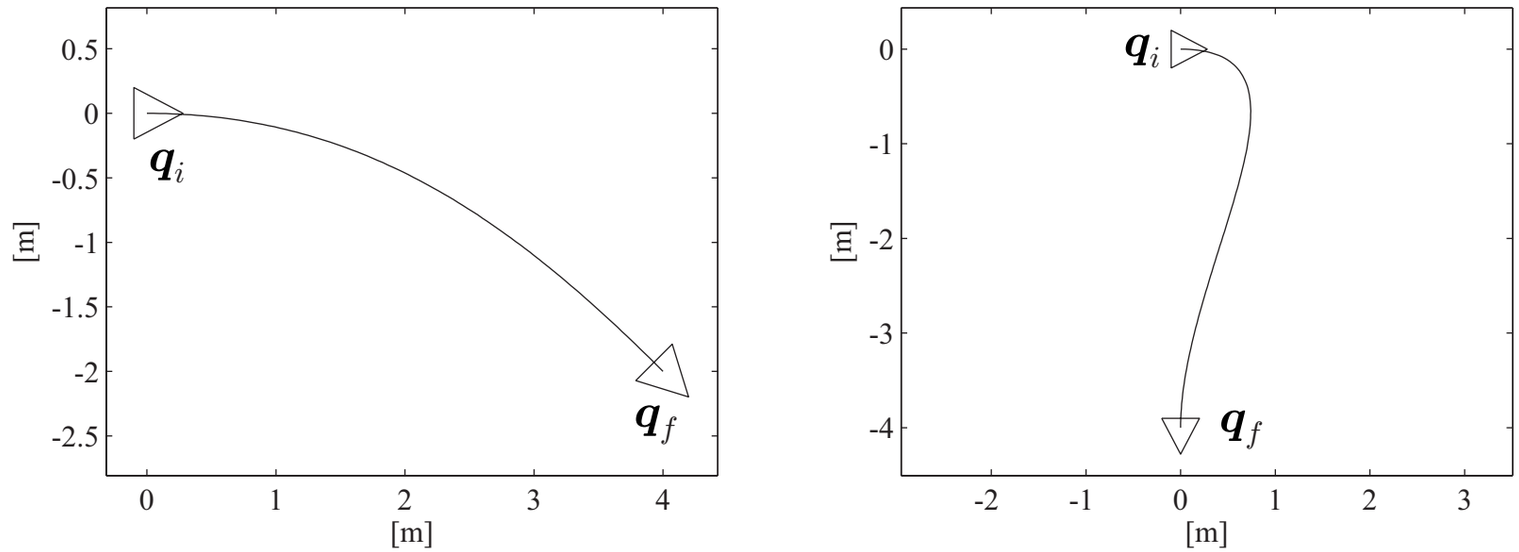
DIPARTIMENTO DI INGEGNERIA INFORMATICA
AUTOMATICA E GESTIONALE ANTONIO RUBERTI

SAPIENZA
UNIVERSITÀ DI ROMA

parking a unicycle: numerical results

1. forward parking

cubic polynomials for cartesian coords x,y (flat outputs)

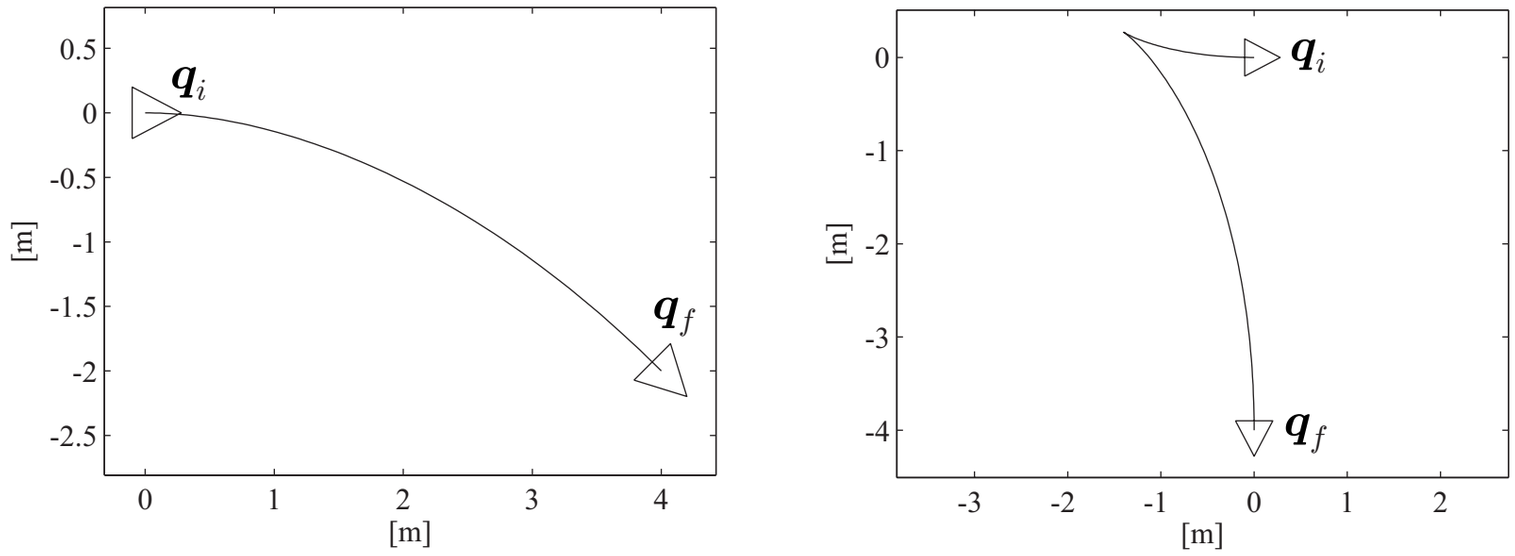


- $k{=}5{>}0$, hence forward motion
- no motion inversions

parking a unicycle: numerical results

1. forward parking

parameterized inputs on chained form

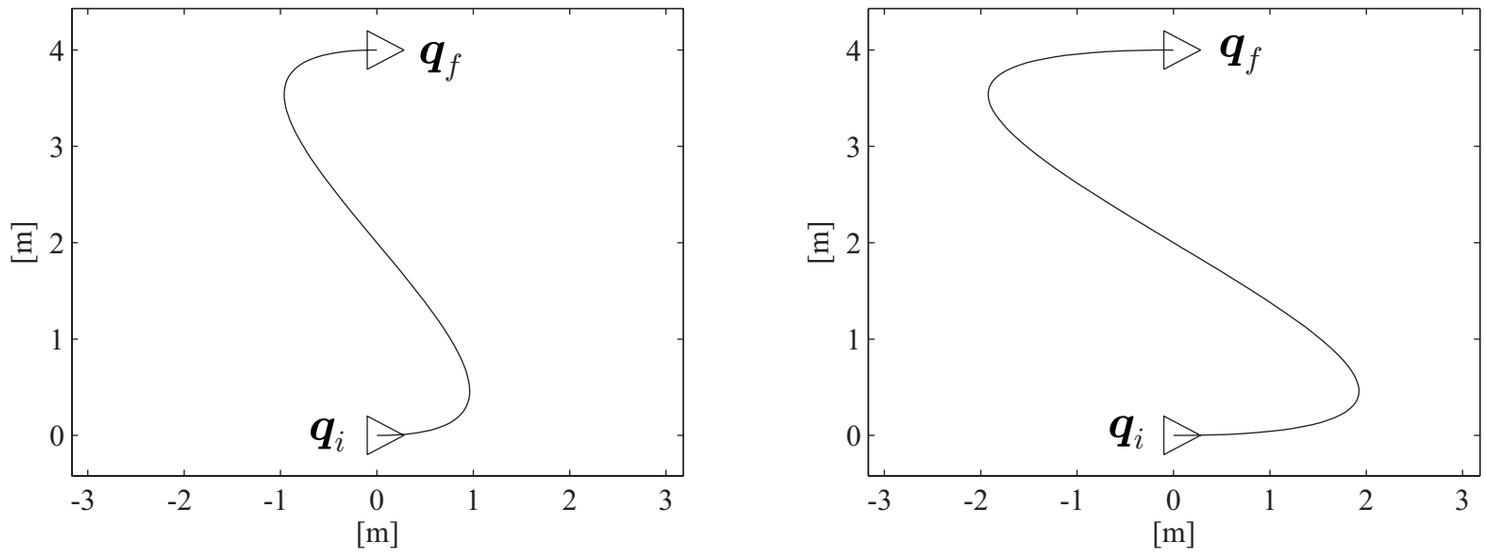


- first maneuver is similar
- a motion inversion (cusp) in the second

parking a unicycle: numerical results

2. parallel parking

cubic polynomials for cartesian coords x,y (flat outputs)

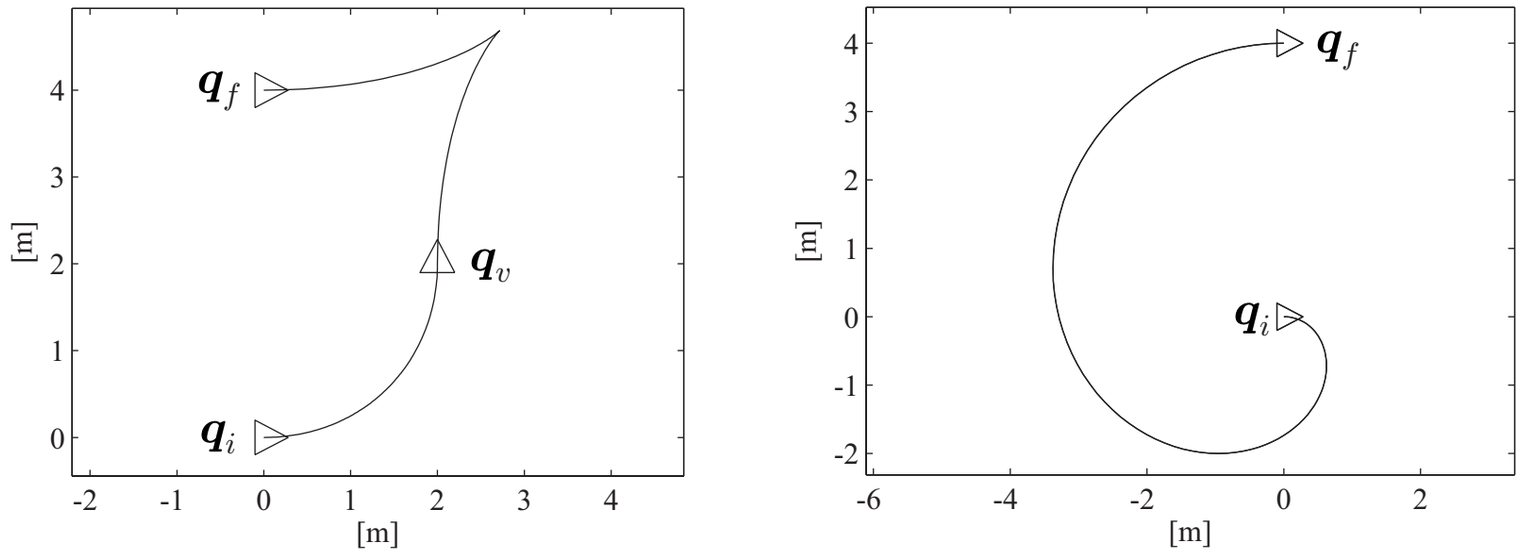


- left: k=10, right: k=20
- no motion inversions

parking a unicycle: numerical results

2. parallel parking

parameterized inputs on chained form

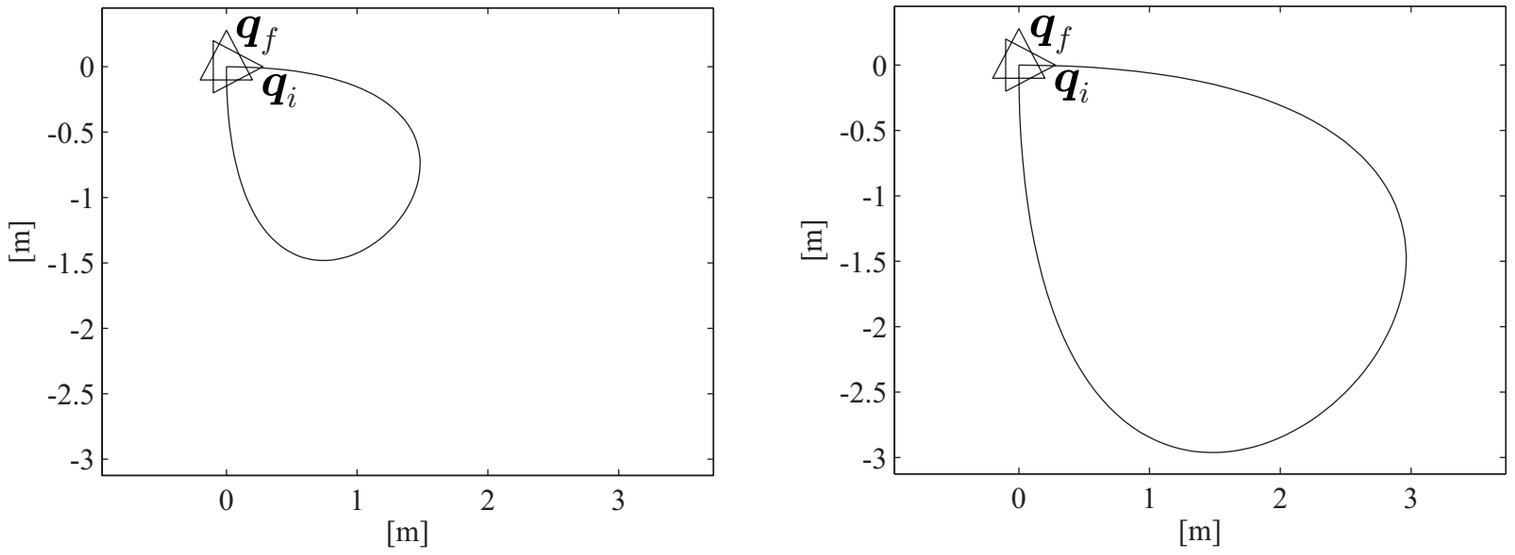


- left: with a via point
- right: requiring a full rotation

parking a unicycle: numerical results

3. pure reorientation

cubic polynomials for cartesian coords x,y (flat outputs)

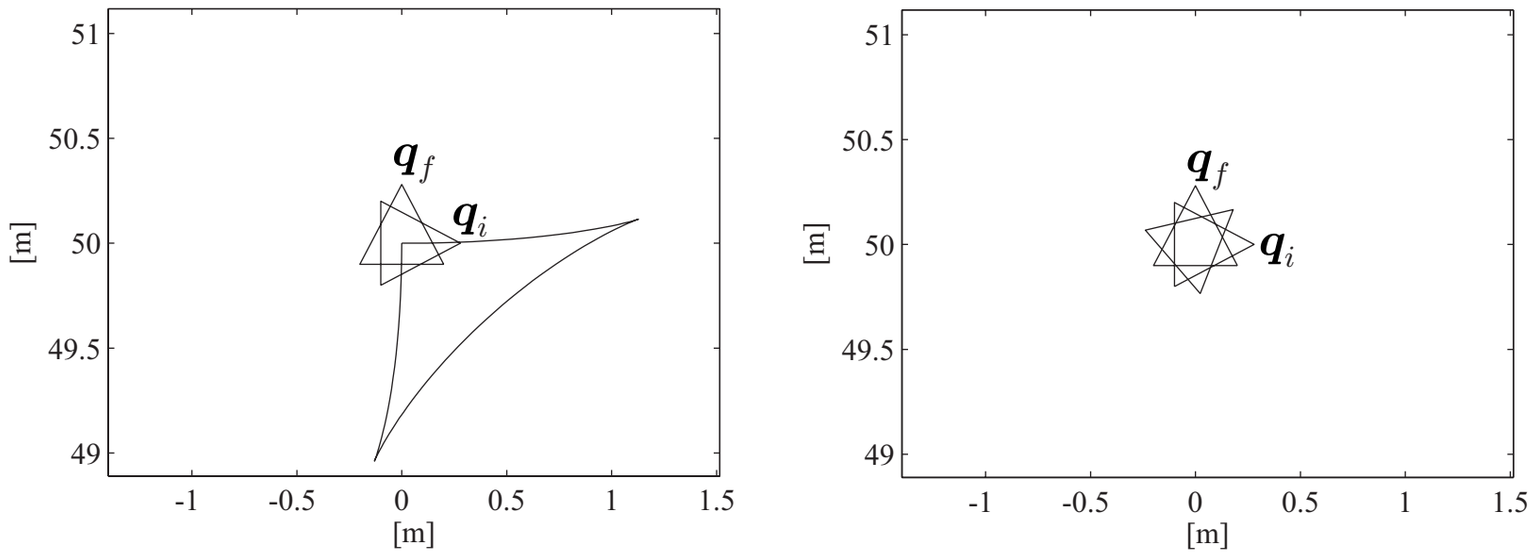


- left: k=10, right: k=20
- need to move the cartesian coordinates!

parking a unicycle: numerical results

3. pure reorientation

parameterized inputs on chained form



- left: straightforward
- right: placing the origin of z_2, z_3 at q_i