

# Question Examples for: Robotics: Final Examination

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Name: .....

First name: .....

Matr.-Nr.: .....

Time: 75 Minuten

- ➡ Please write clearly and do **not** use a red pen.
- ➡ Write your name and your student ID (Matrikelnummer) on *all* pages *now*.
- ➡ There are two different kinds of multiple choice questions: 1) questions with exactly one correct answer and 2) questions with possibly multiple correct answers.

For 1), you will get points only if you check the correct answer.

For 2), you can, for each answer, check "true" or "false". You will get points for each correctly checked answer, loose points for each incorrectly checked answer, and get zero points for not checking an answer. These points are summed up over all answers of the question. If the result for a given question is negative you will get 0 points instead.

	Points	Score
1	5	
$\Sigma$	5	

## 1 (5 points): Example questions

**1.1. Properties of Parabolic Blends (1 point)** When limited by a maximum velocity, parabolic blends are...

One correct answer

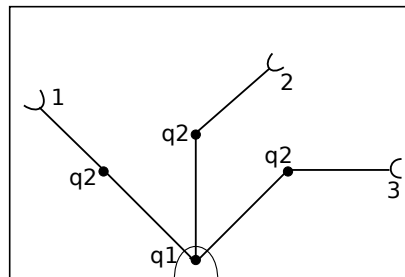
- ☒ faster than cubic splines
- ☐ as quick as cubic splines
- ☐ slower than cubic splines

**1.2. Filter (2 points)** Which of the following filters may converge to a bimodal state distribution, i.e. a distribution with two peaks: one at the left and one at the right end of the corridor?

True/Yes      False/No

- |                                     |                                     |  |
|-------------------------------------|-------------------------------------|--|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <i>Kalman filter</i> , initialized with zero mean and uniform covariance.  |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <i>Unscented Kalman filter</i> , initialized with zero mean and uniform covariance.                              |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <i>Particle filter</i> with 1000 particles, initialized with a uniform distribution over the entire environment. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <i>Histogram filter</i> with 10000 bins, initialized with a uniform distribution over the entire environment.    |

**1.3. From Operational Space to Configuration Space (2 points)** Draw points in configuration space that correspond to the poses 2 and 3 in operational space, like it has already been done for pose 1. (Joint angles increase in counter-clockwise direction.)



**Solution:**

