

ELEC-E8111 Autonomous mobile robots (5p)

Exam 09.4.2019

1. Name and define the five common components of hybrid control architectures.
6p
2. What kind of laser range finders (laser scanner, LiDAR) there are in the market? Of those, what are the most usable in mobile robotics.
6 p
3. Explain shortly the principle and benefits of EKF SLAM and Fast SLAM. What happens when the loop is closed?
6p
4. Explain the probabilistic phases of one operation cycle of the particle filter, exact equations are not required.
6p
5. Explain shortly the idea of Informative Path Planning (IPP). What problems there can be with IPP?
6p
6. Describe a simple kinematic model of a standard four-wheel vehicle, car or tractor. How odometry can be implemented with it? Why odometry alone is not sufficient?
6p