DLMDSEAAD02\_Unit01\_Question01

What is a holonomic motion?

* When the number of degrees of mobility equals the number of degrees of freedom. (1 Pts)
* When the number of degrees of mobility is smaller than the number of degrees of freedom. (0 Pts)
* When the number of degrees of mobility is larger than the number of degrees of freedom. (0 Pts)
* When the number of degrees of mobility and the number of degrees of freedom are zero. (0 Pts)

DLMDSEAAD02\_Unit01\_Question02

What is the second derivative of the position?

* acceleration (1 Pts)
* velocity (0 Pts)
* jerk (0 Pts)
* angular velocity (0 Pts)

DLMDSEAAD02\_Unit01\_Question03

Which of the following is not a possible error source for odometry?

* accelerometer errors (1 Pts)
* ground condition (0 Pts)
* temperature (0 Pts)
* wheel abrasion (0 Pts)

DLMDSEAAD02\_Unit01\_Question04

How many degrees of mobility does an omnidirectional robot in two dimensions have?

* three (1 Pts)
* two (0 Pts)
* one (0 Pts)
* zero (0 Pts)

DLMDSEAAD02\_Unit01\_Question05

How often does the angular information from an inertial measurement unit have to be integrated in order to obtain the particular orientations?

* once (1 Pts)
* twice (0 Pts)
* never (0 Pts)
* thrice (0 Pts)

DLMDSEAAD02\_Unit02\_Question01

Which of the following is not a commonly used algorithm for path finding?

* elastic band (1 Pts)
* roadmaps (0 Pts)
* cell decompositions (0 Pts)
* potential fields (0 Pts)

DLMDSEAAD02\_Unit02\_Question02

Which artificial potential pushes a system away from obstacles?

* repulsive potential (1 Pts)
* restrictive potential (0 Pts)
* attractive potential (0 Pts)
* associated potential (0 Pts)

DLMDSEAAD02\_Unit02\_Question03

Which artificial potential pulls a system in the direction of the goal?

* attractive potential (1 Pts)
* repulsive potential (0 Pts)
* restrictive potential (0 Pts)
* associated potential (0 Pts)

DLMDSEAAD02\_Unit02\_Question04

Which types of position determination approaches can be differentiated?

* landmark-based and sensor-based (1 Pts)
* planning-based and reactive (0 Pts)
* static and dynamic (0 Pts)
* metric and topological (0 Pts)

DLMDSEAAD02\_Unit02\_Question05

Which of the following is now a common cell decomposition method used for path finding?

* Delaunay-based cell decomposition (1 Pts)
* visibility-based cell decomposition (0 Pts)
* trapezoid cell decomposition (0 Pts)
* grid cell decomposition (0 Pts)

DLMDSEAAD02\_Unit03\_Question01

What is another name for Monte Carlo localization?

* particle filter (1 Pts)
* Kalman filter (0 Pts)
* Markov localization (0 Pts)
* triangulation (0 Pts)

DLMDSEAAD02\_Unit03\_Question02

Which of the following methods is the basis of position determination in GPS receivers?

* trilateration (1 Pts)
* triangulation (0 Pts)
* Kalman filter (0 Pts)
* Markov localization (0 Pts)

DLMDSEAAD02\_Unit03\_Question03

What is the probability density called after new sensor data has been integrated?

* posterior density (1 Pts)
* prior density (0 Pts)
* likelihood (0 Pts)
* transition density (0 Pts)

DLMDSEAAD02\_Unit03\_Question04

How many satellite signals are needed to perform positioning by GPS on earth or in the air?

* four (1 Pts)
* three (0 Pts)
* two (0 Pts)
* one (0 Pts)

DLMDSEAAD02\_Unit03\_Question05

What kind of probability distribution is used for the initial particle sampling in Monte Carlo localization when the initial system’s state is completely unknown?

* uniform distribution (1 Pts)
* Gaussian distribution (0 Pts)
* posterior distribution (0 Pts)
* prior distribution (0 Pts)

DLMDSEAAD02\_Unit04\_Question01

Which of the following is not an assumption for the Kalman filter?

* nonlinear model (1 Pts)
* linear transition model (0 Pts)
* linear measurement model (0 Pts)
* Gaussian distributed random variable (0 Pts)

DLMDSEAAD02\_Unit04\_Question02

What is a Jacobian matrix?

* a matrix consisting of all partial derivatives (1 Pts)
* a matrix consisting of the measurement model (0 Pts)
* a matrix consisting of the state transition (0 Pts)
* a matrix consisting of the measurement covariance (0 Pts)

DLMDSEAAD02\_Unit04\_Question03

What is another name for the probability hypothesis density?

* intensity function (1 Pts)
* Jacobian matrix (0 Pts)
* Kalman gain (0 Pts)
* observation model (0 Pts)

DLMDSEAAD02\_Unit04\_Question04

What is the fusion of sensor raw data called?

* early fusion (1 Pts)
* middle fusion (0 Pts)
* late fusion (0 Pts)
* slow fusion (0 Pts)

DLMDSEAAD02\_Unit04\_Question05

Which information is not needed for the prediction step in the extended Kalman filter?

* Kalman gain (1 Pts)
* state transition function (0 Pts)
* process covariance (0 Pts)
* state transition Jacobian (0 Pts)

DLMDSEAAD02\_Unit05\_Question01

What is the name of a trajectory generated from piecewise accelerations, zero acceleration, and decelerations?

* trapezoidal velocity trajectory (1 Pts)
* polynomial trajectory (0 Pts)
* spline trajectory (0 Pts)
* B-spline trajectory (0 Pts)

DLMDSEAAD02\_Unit05\_Question02

Which of the following is not a part of the motion planning process for mobile systems?

* object detection (1 Pts)
* mission planning (0 Pts)
* path planning (0 Pts)
* trajectory generation (0 Pts)

DLMDSEAAD02\_Unit05\_Question03

The motion of a dynamic object is predicted solely based on its assumed motion model. What type of assumption is made?

* physics-based assumption (1 Pts)
* maneuver-based assumption (0 Pts)
* interaction-aware assumption (0 Pts)
* no assumption (0 Pts)

DLMDSEAAD02\_Unit05\_Question04

Which of the following is a sample-based planning algorithm?

* probabilistic roadmap (1 Pts)
* Voronoi diagram (0 Pts)
* potential field (0 Pts)
* visibility graph (0 Pts)

DLMDSEAAD02\_Unit05\_Question05

A mobile system moves in the three-dimensional Euclidean space and is able to rotate and translate in all directions. How many dimensions does its configuration space have?

* six (1 Pts)
* four (0 Pts)
* three (0 Pts)
* five (0 Pts)