

**Control of Mobile Robots - Laboratory 3**  
**Motion planning algorithms**  
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### Exercise 1

Using RRT\* algorithm available in MATLAB Navigation Toolbox and the *simpleMap* create a simple planning example, performing one or more executions of the algorithm and looking at the planned path for different values of the algorithm parameters.

In particular, try to select a validation distance and a connection distance that are appropriate to the selected environment. Observe the different solutions obtained setting to *true* or to *false* the *ContinueAfterGoalReached* property.

### Exercise 2

Using RRT\* algorithm and the *simpleMap*, define a start and a goal configuration and solve the planning problem for an increasing number of nodes (setting to *true* the *ContinueAfterGoalReached* property). Analyse the results considering the path length and the time needed to plan the path, and select the number of nodes that represents the best compromise.

Run the two analysis more than once. Do you get the same results? Why?

### Exercise 3

Using the *complexMap*, select as start configuration  $[1, 1, 0]$  and as goal configuration  $[20, 20, \pi/2]$ , and solve the planning problem using RRT and RRT\*. Select the planner parameters that represent the best compromise between solution quality and planning time.

Analyse the results obtained with the two algorithms considering the path length and the time needed to plan the path, and a different number of maximum nodes.