16-662 Robot Autonomy
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The Robotics Institute

Homework 3

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1 Path Planning via RRT

Parameters:
q step size: 0.01, target p = 0.3
Test 1: Seed = 0, Sampled: 1079 nodes, Planning time: 15.72s, Path length = 254
Test 2: Seed = 12, Sampled: 1289 nodes, Planning time: 19.47s, Path length = 321
Test 3: Seed = 20, Sampled: 694 nodes, Planning time: 8.75s, Path length = 243
Test 4: Seed = 35, Sampled: 709 nodes, Planning time: 9.21s, Path length = 232
Test 5: Seed = 45, Sampled: 745 nodes, Planning time: 9.96s, Path length = 290

$$\textbf{Planning Time:} \quad Mean: 903.2s, Max: 19.47s, Min: 8.75s$$
$$\textbf{Sampled Nodes:} \quad Mean: 12.62, Max: 1289, Min: 694$$
$$\textbf{Path Length:} \quad Mean: 268, Max: 321, Min: 232$$

2 Constrained Planning

Parameters:
Projected step size: 0.01, constraint threshold: 0.002 , q step size: 0.08, target p: 0.15
Test 1: Seed = 7,
   Sampled: 393 nodes, Planning time: 45.23s, Path length = 56

Test 2: Seed = 16,
   Sampled: 128 nodes, Planning time: 14.55s, Path length = 43

Test 3: Seed = 20,
   Sampled: 225 nodes, Planning time: 22.64s, Path length = 40

Test 4: Seed = 33,
   Sampled: 93 nodes, Planning time: 9.99s, Path length = 34

Test 5: Seed = 41,
   Sampled: 83 nodes, Planning time: 6.26s, Path length = 35

Planning Time: $Mean : 19.73s, Max : 45.23s, Min : 6.26s$
Sampled Nodes: $Mean : 184.4, Max : 393, Min : 83$
Path Length: $Mean : 41.6, Max : 56, Min : 34$