sim_bidirectional_rrt

October 5, 2020

1 Bidirectional Sampling-Based Motion Planning

```
In [ ]: # The autoreload extension will automatically load in new code as you edit files,
        # so you don't need to restart the kernel every time
        %load_ext autoreload
        %autoreload 2

        import numpy as np
        import matplotlib.pyplot as plt
        from P2_rrt import *
        from P4_bidirectional_rrt import *

        plt.rcParams['figure.figsize'] = [7, 7] # Change default figure size
```

1.0.1 Set up workspace

```
In [27]: MAZE = np.array([
             (( 5, 5), (-5, 5)),
             ((-5, 5), (-5,-5)),
             ((-5,-5), ( 5,-5)),
             (( 5,-5), ( 5, 5)),
             ((-5, 2), (-1, 2)),
             ((-1, 2), (-1,-1)),
             (( 0, 2), ( 0,-1)),
             (( 0, 2), ( 5, 2))
         ])
```

1.1 Normal RRT

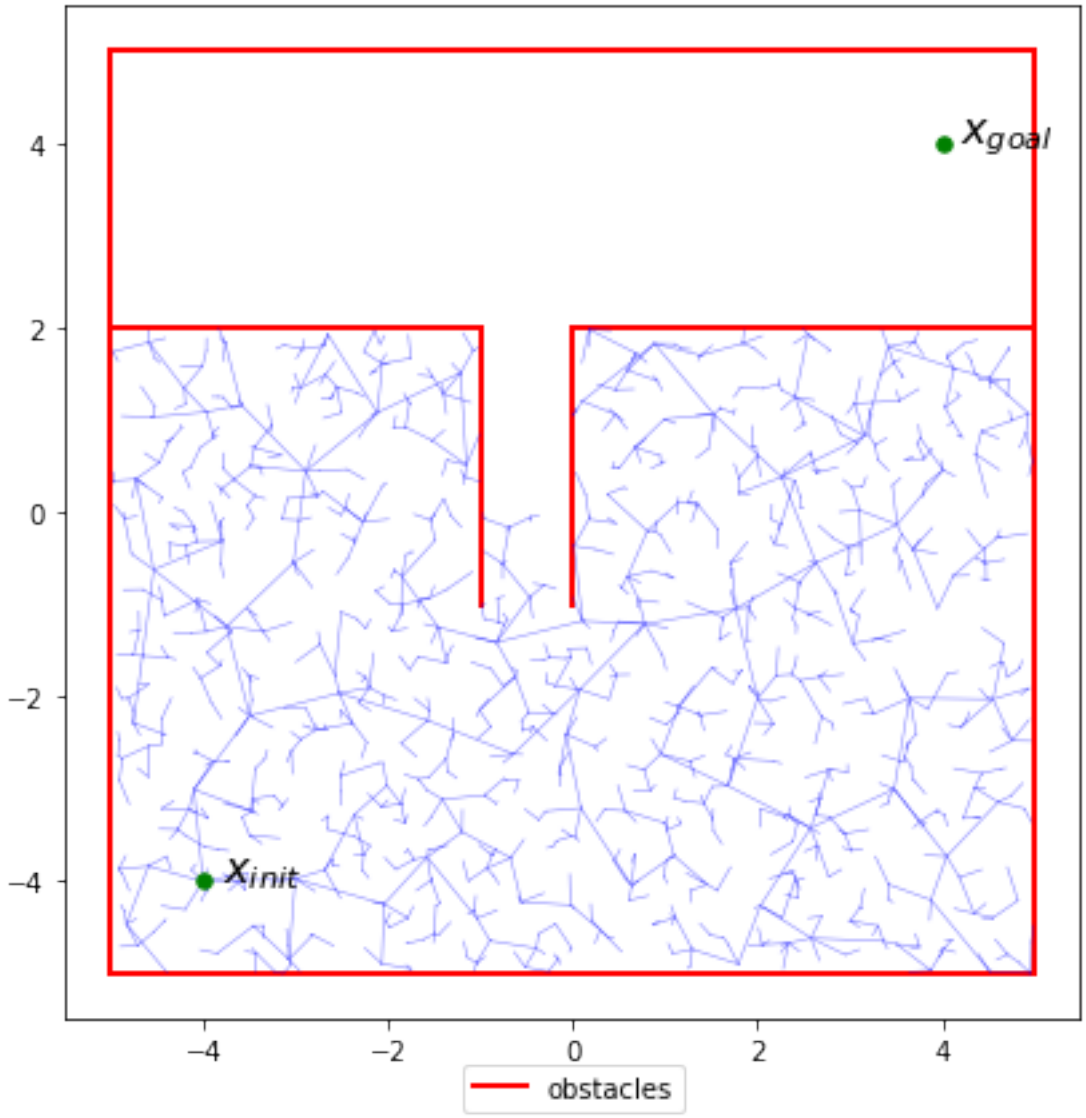
On this "bugtrap" problem, normal RRT often will fail to find a find a path.

1.1.1 Geometric planning

```
In [30]: grrt = GeometricRRT([-5,-5], [5,5], [-4,-4], [4,4], MAZE)
         grrt.solve(1.0, 2000)
```

```
Solution not found!
```

Out[30]: False

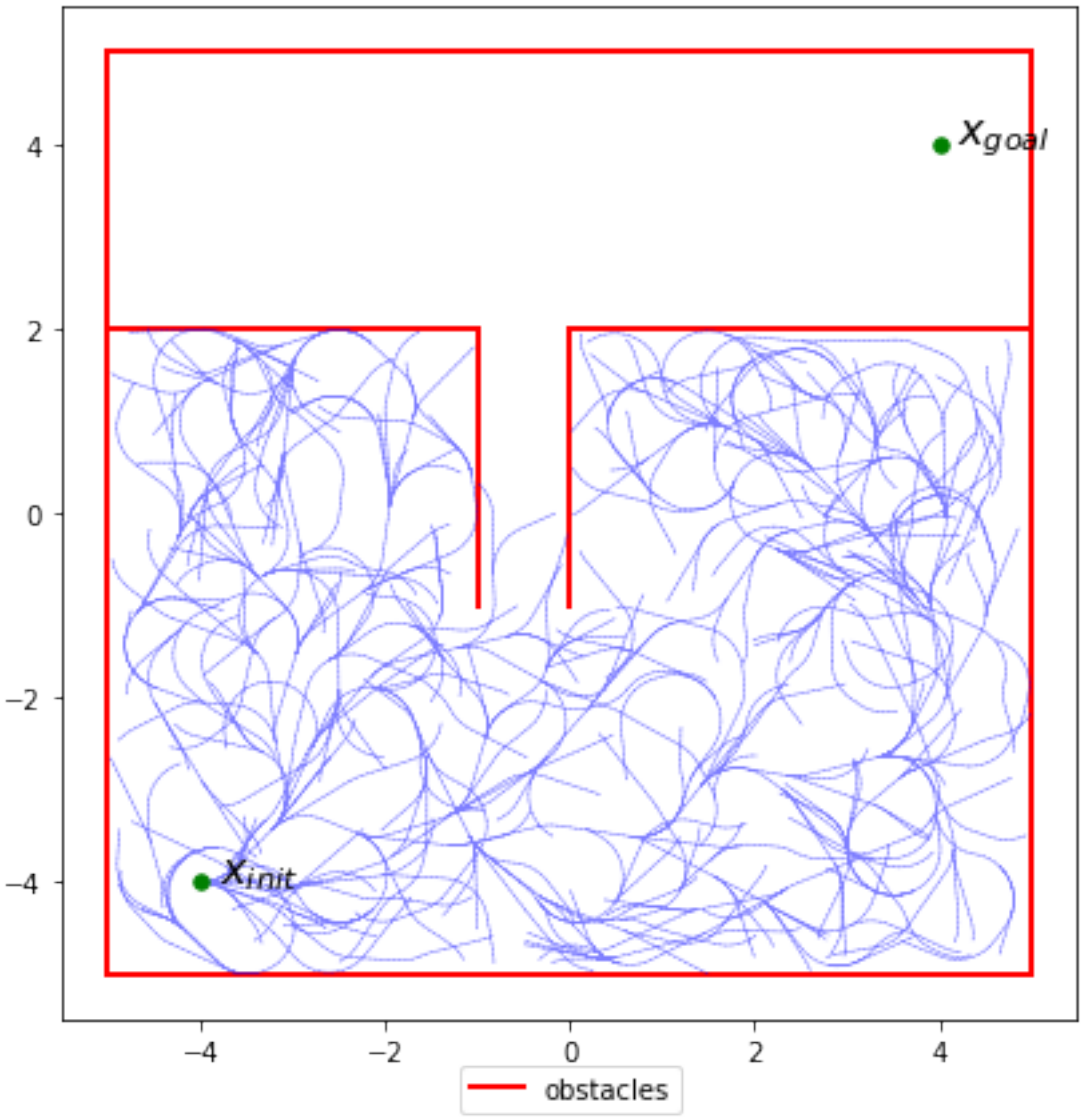


1.1.2 Dubins car planning

```
In [29]: drrt = DubinsRRT([-5,-5,0], [5,5,2*np.pi], [-4,-4,0], [4,4,np.pi/2], MAZE, .5)
         drrt.solve(1.0, 1000)
```

```
Solution not found!
```

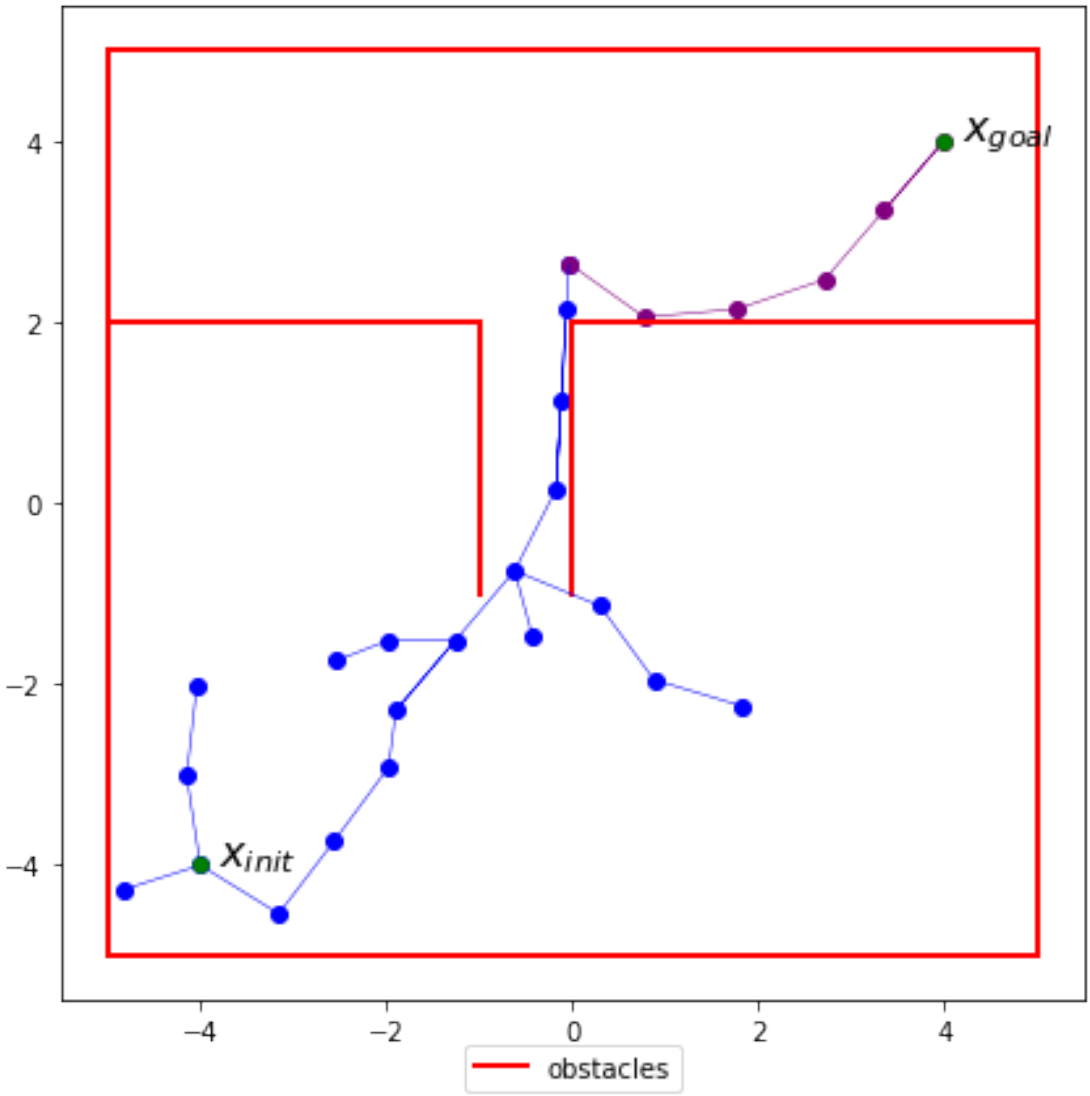
Out[29]: False



1.2 RRTConnect

1.2.1 Geometric planning

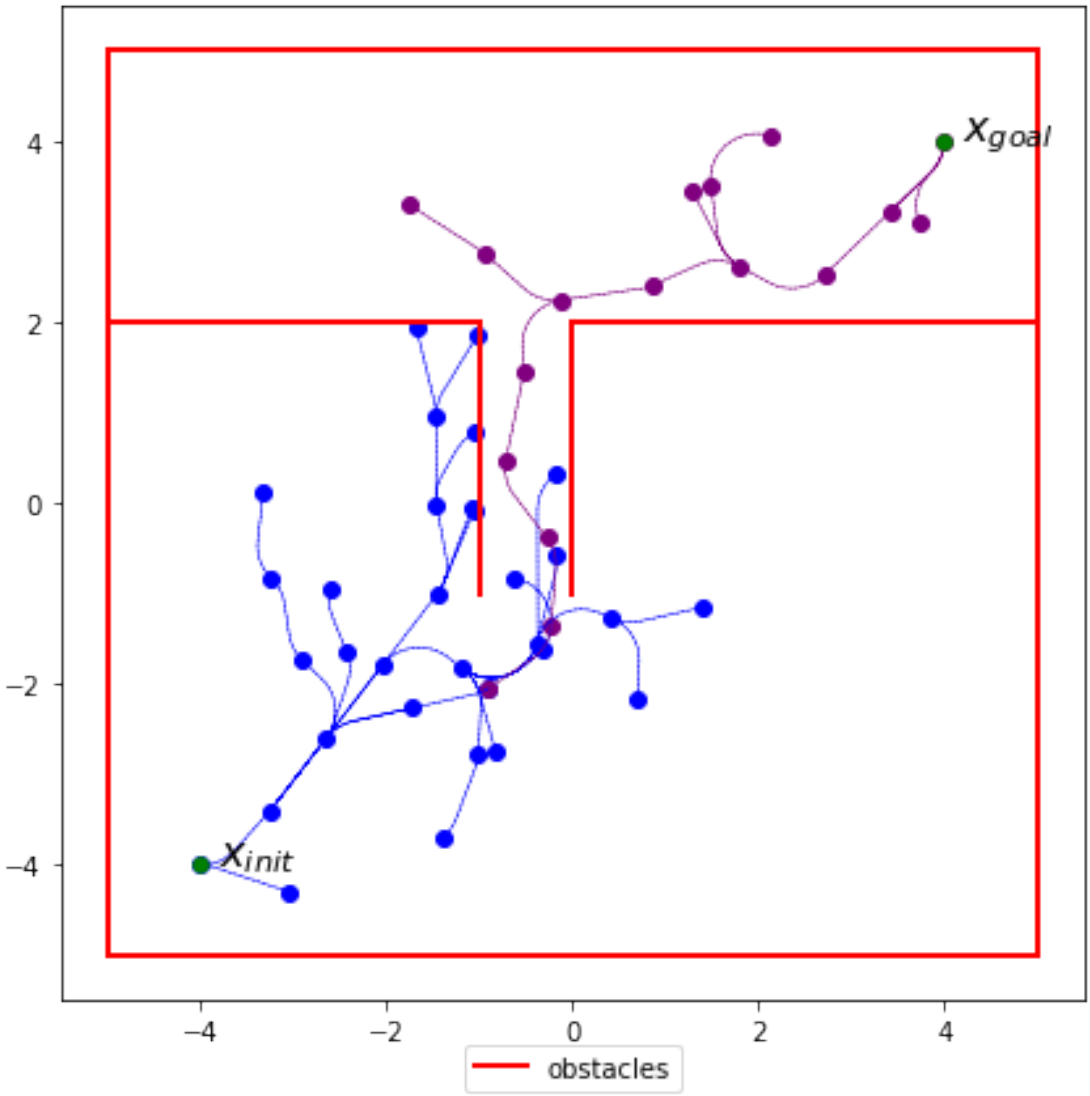
```
In [32]: grrt = GeometricRRTConnect([-5,-5], [5,5], [-4,-4], [4,4], MAZE)
         grrt.solve(1.0, 2000)

found: True
outofmem: False
```



1.2.2 Dubins car planning

```
In [33]: drrt = DubinsRRTConnect([-5,-5,0], [5,5,2*np.pi], [-4,-4,0], [4,4,np.pi/2], MAZE, .5)
         drrt.solve(1.0, 1000)
```

```
found: True
outofmem: False
```



In [ ]: