```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=9455
 3
     import sys; print('Python %s on %s' % (sys.version, sys.platform))
     01_My_Python_Code', 'E:/1 \\ \text{0} \\ \
     01_My_Python_Code'])
 6
    PyDev console: starting.
    Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
 8
    python code/01_My_Python_Code')
10 Backend TkAgg is interactive backend. Turning interactive mode on.
     Waiting 1s.....
12
13
    This is the R_2_1 _standard_test.xlsx optimization process solved by ENSGA-II algorithm.
14
15
     Start
16
17
     Before iteration:
18
         Read basic data
19
         Parameter setting:
20
            trail = 31
21
            Pop\_size = 10
             Tolerance iteration unchanged number = 6
23
             Chrom\_size = 6
            Iter_num_GA = 300
24
25
             Select_rate = 0.85
26
             Crossover rate = 0.8
             Mutation rate = 0.75
27
28
             Mu_oper_type = 2
29
             vessel\_move\_way = 1
30
            coefficient for Obj1= 1.0
            coefficient for Obj2= 1.0
31
             gen = 0
32
33
     Iteration begin:
34
35
     Beging the No. 0 iteration:
         obj[0] = 12.00 temp_best_value_gen = 12.00
36
37
         The No. 0 iteration is finished!
38
39
     Beging the No. 1 iteration:
40
         obj[gen-1] = 12.00 temp_best_value_gen = 11.10
         Yes, update solution and obj[gen] = 11.10
41
         solution chromosome =
42
43
             first level: [ [2.27 4.05]
            second level: [3. 0.]
44
            third level: [4. 6.]]
45
46
         The No. 1 iteration is finished!
47
48
     Beging the No. 2 iteration:
         obj[gen-1] = 11.10 temp_best_value_gen = 11.10
49
50
         No, maintain solution and obj[gen] = 11.10, and the tolerance_counter = 1
51
         solution chromosome =
52
             first level: [ [2.27 4.05]
53
             second level: [3. 0.]
54
            third level: [4. 6.]]
55
         The No. 2 iteration is finished!
56
57
     Beging the No. 3 iteration:
58
         obi[gen-1] = 11.10 temp best value gen = 11.10
59
         No, maintain solution and obj[gen] = 11.10, and the tolerance_counter = 2
60
         solution chromosome =
61
             first level: [ [2.27 4.05]
62
             second level: [3. 0.]
            third level: [4. 6.]]
63
         The No. 3 iteration is finished!
64
65
     Beging the No. 4 iteration:
66
67
         obj[gen-1] = 11.10 temp_best_value_gen = 11.10
68
         No, maintain solution and obj[gen] = 11.10, and the tolerance_counter = 3
69
         solution chromosome =
70
            first level: [ [2.27 4.05]
71
             second level: [3. 0.]
            third level: [4. 6.]
73
         The No. 4 iteration is finished!
74
75
     Beging the No. 5 iteration:
         obj[gen-1] = 11.10 temp_best_value_gen = 11.10
76
         No, maintain solution and obj[gen] = 11.10, and the tolerance_counter = 4
77
78
         solution chromosome =
             first level: [ [2.27 4.05]
```

```
80
           second level: [3. 0.]
 81
          third level: [4. 6.]]
 82
        The No. 5 iteration is finished!
 83
     Beging the No. 6 iteration:
        obj[gen-1] = 11.10 temp_best_value_gen = 11.10
No, maintain solution and obj[gen] = 11.10, and the tolerance_counter = 5
 85
 86
 87
        solution chromosome =
 88
          first level: [ [2.27 4.05]
          second level: [3. 0.]
 89
 90
          third level: [4. 6.]]
 91
        The No. 6 iteration is finished!
 92
 93 Beging the No. 7 iteration:
 94
        obj[gen-1] = 11.10 temp\_best\_value\_gen = 11.10
 95
        No, maintain solution and obj[gen] = 11.10, and the tolerance_counter = 6
        solution chromosome =
 96
 97
          first level: [ [2.27 4.05]
 98
          second level: [3. 0.]
 99
          third level: [4. 6.]]
100
        The No. 7 iteration is finished!
101
102
103
104 The iteration is terminated and then visulize the solution:
105
        solution chromosome =
106
          first level: [ [2.27 4.05]
          second level: [3. 0.] third level: [4. 6.]
107
108
109
        Objective function values and some other indicators:
110
          0bi0 = 4.00
                                 Obj1 = 7.10
                                                         Obj0 + Obj1 = 11.10
          Total movement of crane: 4.10
111
112
          Total waiting time in berth position: 3.00
113
           Total index of q during berthing: 27.00
114
        Specific arrangement for each vessel:
115
                               li: 4.0
                                                    xi: 2.3
                                                                         bow of i: 0.3
                                                                                                     tail of i: 4.3
                                                                                                                               gama_i0: 3.0
                                                                                                                                                            gama_i1: 5.0
           V_id: 0
                     duration_time_i: 2.0
                                                         demand_i: 160.0
                                                                                        work load_i: 160.0
                                                                                                                          work load gap_i: 0
116
           V id: 1
                                                    xi: 4.1
                                                                        bow of i: 0.1
                                                                                                     tail of i: 8.1
                                                                                                                               gama_i0: 0.0
                               li: 8.0
                                                                                                                                                            gama_i1: 1.0
                                                         demand_i: 120.0
                                                                                        work load_i: 120.0
                                                                                                                          work load gap_i: 0
                     duration_time_i: 1.0
117
118 Algorithm finished and the total CPU time: 63 s
119 End
120
```