```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=37010
 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 = 15
21
            Pop\_size = 10
             Tolerance iteration unchanged number = 8
23
             Chrom\_size = 6
            Iter_num_GA = 300
24
25
             Select_rate = 0.8
26
             Crossover rate = 0.75
27
             Mutation rate = 0.95
28
             Mu_oper_type = 1
29
             vessel\_move\_way = 1
30
            coefficient for Obj1= 0.5
            coefficient for Obj2= 1.5
31
             gen = 0
32
33
     Iteration begin:
34
35
     Beging the No. 0 iteration:
         obj[0] = 10.53 temp_best_value_gen = 10.53
36
37
         The No. 0 iteration is finished!
38
39
     Beging the No. 1 iteration:
40
         obj[gen-1] = 10.53 temp_best_value_gen = 10.53
41
         No, maintain solution and obj[gen] = 10.53, and the tolerance_counter = 1
42
         solution chromosome =
43
             first level: [ [5.04 4.14]
            second level: [0, 3,]
44
            third level: [3. 2.]]
45
46
         The No. 1 iteration is finished!
47
48
     Beging the No. 2 iteration:
         obj[gen-1] = 10.53 temp_best_value_gen = 10.53
49
50
         No, maintain solution and obj[gen] = 10.53, and the tolerance_counter = 2
51
         solution chromosome =
52
             first level: [ [5.04 4.14]
53
             second level: [0.3.]
54
            third level: [3. 2.]]
55
         The No. 2 iteration is finished!
56
57
     Beging the No. 3 iteration:
58
         obi[gen-1] = 10.53 temp best value gen = 10.53
59
         No, maintain solution and obj[gen] = 10.53, and the tolerance_counter = 3
60
         solution chromosome =
61
             first level: [ [5.04 4.14]
62
             second level: [0.3.]
            third level: [3. 2.]]
63
         The No. 3 iteration is finished!
64
65
     Beging the No. 4 iteration:
66
67
         obj[gen-1] = 10.53 temp_best_value_gen = 10.53
68
         No, maintain solution and obj[gen] = 10.53, and the tolerance_counter = 4
69
         solution chromosome =
70
             first level: [ [5.04 4.14]
             second level: [0.3.]
71
            third level: [3. 2.]
73
         The No. 4 iteration is finished!
74
75
     Beging the No. 5 iteration:
         obi[gen-1] = 10.53 temp best value gen = 10.53
76
         No, maintain solution and obj[gen] = 10.53, and the tolerance_counter = 5
77
         solution chromosome =
78
             first level: [ [5.04 4.14]
```

```
80
           second level: [0. 3.]
 81
          third level: [3. 2.]]
 82
        The No. 5 iteration is finished!
 83
     Beging the No. 6 iteration:
       obj[gen-1] = 10.53 temp_best_value_gen = 10.53
No, maintain solution and obj[gen] = 10.53, and the tolerance_counter = 6
 85
 86
 87
        solution chromosome =
 88
          first level: [ [5.04 4.14]
          second level: [0, 3.]
 89
 90
          third level: [3. 2.]]
 91
        The No. 6 iteration is finished!
 92
 93 Beging the No. 7 iteration:
 94
        obj[gen-1] = 10.53 temp_best_value_gen = 10.53
 95
        No, maintain solution and obj[gen] = 10.53, and the tolerance_counter = 7
 96
        solution chromosome =
 97
          first level: [ [5.04 4.14]
 98
          second level: [0.3.]
 99
          third level: [3. 2.]]
100
        The No. 7 iteration is finished!
101
102
     Beging the No. 8 iteration:
        obj[gen-1] = 10.53 temp best value gen = 10.53
103
104
        No, maintain solution and obj[gen] = 10.53, and the tolerance_counter = 8
105
        solution chromosome =
106
          first level: [ [5.04 4.14]
107
          second level: [0. 3.]
          third level: [3. 2.]
108
109
        The No. 8 iteration is finished!
110
111
112
113 The iteration is terminated and then visulize the solution:
114
        solution chromosome =
115
          first level: [[5.04 4.14]
116
          second level: [0.3.]
117
          third level: [3. 2.]
118
        Objective function values and some other indicators:
                                                        Obj0 + Obj1 = 10.36
119
          Obj0 = 5.00
                                 Obj1 = 5.36
          Total movement of crane: 2.36
120
121
          Total waiting time in berth position: 3.00
          Total index of q during berthing: 34.00
122
123
        Specific arrangement for each vessel:
124
                              li: 4.0
                                                   xi: 5.0
                                                                       bow of i: 3.0
                                                                                                   tail of i: 7.0
                                                                                                                            gama_i0: 0.0
          V_id: 0
                                                                                                                                                        gama_i1: 3.0
                    duration_time_i: 3.0
                                                        demand_i: 160.0
                                                                                      work load_i: 160.0
                                                                                                                       work load gap_i: 0
125
                                                                       bow of i: 0.1
                                                                                                   tail of i: 8.1
                                                                                                                             gama_i0: 3.0
          V_id: 1
                              li: 8.0
                                                   xi: 4.1
                                                                                                                                                        gama_i1: 6.0
                    duration_time_i: 3.0
                                                        demand_i: 120.0
                                                                                      work load_i: 120.0
                                                                                                                        work load gap_i: 0
     Algorithm finished and the total CPU time: 69 s
127
128 End
129
```