```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=46262
 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:
            trail = 35
20
21
            Pop\_size = 20
             Tolerance iteration unchanged number = 10
23
             Chrom\_size = 6
            Iter_num_GA = 300
24
25
             Select_rate = 0.9
26
             Crossover rate = 0.8
27
             Mutation rate = 0.8
28
             Mu_oper_type = 2
29
             vessel\_move\_way = 1
30
            coefficient for Obj1= 0.5
            coefficient for Obj2= 1.5
31
             gen = 0
32
33
34
     Iteration begin:
35
     Beging the No. 0 iteration:
         obj[0] = 8.45 temp_best_value_gen = 8.45
36
37
         The No. 0 iteration is finished!
38
39
     Beging the No. 1 iteration:
         obj[gen-1] = 8.45 temp_best_value_gen = 8.45
40
41
         No, maintain solution and obj[gen] = 8.45, and the tolerance_counter = 1
42
         solution chromosome =
43
             first level: [ [2.33 4.04]
            second level: [1. 0.]
44
            third level: [3. 6.]]
45
46
         The No. 1 iteration is finished!
47
48
     Beging the No. 2 iteration:
         obj[gen-1] = 8.45 temp_best_value_gen = 8.45
49
50
         No, maintain solution and obj[gen] = 8.45, and the tolerance_counter = 2
51
         solution chromosome =
52
             first level: [ [2.33 4.04]
53
             second level: [1. 0.]
54
            third level: [3. 6.]]
55
         The No. 2 iteration is finished!
56
57
     Beging the No. 3 iteration:
58
         obi[gen-1] = 8.45 temp best value gen = 8.45
59
         No, maintain solution and obj[gen] = 8.45, and the tolerance_counter = 3
60
         solution chromosome =
61
             first level: [ [2.33 4.04]
62
             second level: [1. 0.]
            third level: [3. 6.]]
63
         The No. 3 iteration is finished!
64
65
     Beging the No. 4 iteration:
66
67
         obj[gen-1] = 8.45 temp_best_value_gen = 8.45
68
         No, maintain solution and obj[gen] = 8.45, and the tolerance_counter = 4
69
         solution chromosome =
70
            first level: [ [2.33 4.04]
             second level: [1. 0.]
71
            third level: [3. 6.]
73
         The No. 4 iteration is finished!
74
75
    Beging the No. 5 iteration:
         obi[gen-1] = 8.45 temp best value gen = 8.45
76
         No, maintain solution and obj[gen] = 8.45, and the tolerance_counter = 5
77
78
         solution chromosome =
             first level: [ [2.33 4.04]
```

```
unknown
  80
           second level: [1. 0.]
  81
           third level: [3. 6.]]
  82
        The No. 5 iteration is finished!
  83
      Beging the No. 6 iteration:
  85
        obj[gen-1] = 8.45 temp best value gen = 8.45
        No, maintain solution and obj[gen] = \overline{8.45}, and the tolerance_counter = 6
  86
  87
        solution chromosome =
  88
           first level: [[2.33 4.04]
  89
           second level: [1. 0.]
  90
           third level: [3. 6.]]
  91
        The No. 6 iteration is finished!
  92
  93 Beging the No. 7 iteration:
  94
        obj[gen-1] = 8.45 temp_best_value_gen = 8.45
  95
        No, maintain solution and obj[gen] = 8.45, and the tolerance_counter = 7
  96
        solution chromosome =
  97
           first level: [ [2.33 4.04]
  98
           second level: [1. 0.]
 99
           third level: [3. 6.]]
100
        The No. 7 iteration is finished!
101
102
      Beging the No. 8 iteration:
        obj[gen-1] = 8.45 temp best value gen = 8.45
103
        No, maintain solution and obj[gen] = 8.45, and the tolerance_counter = 8
104
105
        solution chromosome =
106
           first level: [[2.33 4.04]
107
           second level: [1. 0.]
           third level: [3. 6.]
108
109
        The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112
        obj[gen-1] = 8.45 temp_best_value_gen = 8.45
113
        No, maintain solution and obj[gen] = 8.45, and the tolerance_counter = 9
114
        solution chromosome =
115
           first level: [ [2.33 4.04]
116
           second level: [1. 0.]
           third level: [3, 6,]]
117
        The No. 9 iteration is finished!
118
119
120 Beging the No. 10 iteration:
        obj[gen-1] = 8.45 temp_best_value_gen = 8.45
121
        No, maintain solution and obj[gen] = 8.45, and the tolerance_counter = 10
122
123
        solution chromosome =
124
           first level: [ [2.33 4.04]
125
           second level: [1. 0.]
126
           third level: [3. 6.]]
127
        The No. 10 iteration is finished!
128
129
130
131 The iteration is terminated and then visulize the solution:
132
        solution chromosome =
           first level: [ [2.33 4.04]
133
134
           second level: [1. 0.]
135
           third level: [3. 6.]]
136
        Objective function values and some other indicators:
137
           Obj0 = 3.00
                                Obj1 = 4.64
                                                       Obj0 + Obj1 = 7.64
138
           Total movement of crane: 3.64
139
           Total waiting time in berth position: 1.00
140
           Total index of q during berthing: 22.00
141
        Specific arrangement for each vessel:
                             li: 4.0
                                                                      bow of i: 0.3
                                                                                                                          gama i0: 1.0
142
           V_id: 0
                                                                                                 tail of i: 4.3
                                                                                                                                                     gama i1: 4.0
                    duration_time_i: 3.0
                                                       demand_i: 160.0
                                                                                     work load_i: 160.0
                                                                                                                     work load gap_i: 0
143
           V_id: 1
                                                                      bow of i: 0.0
                              li: 8.0
                                                  xi: 4.0
                                                                                                 tail of i: 8.0
                                                                                                                          gama_i0: 0.0
                                                                                                                                                     gama_i1: 1.0
                     duration_time_i: 1.0
                                                       demand_i: 120.0
                                                                                     work load_i: 120.0
                                                                                                                     work load gap_i: 0
145 Algorithm finished and the total CPU time: 166 s
146 End
147
```