```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=27332
 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')
    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 = 3
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 = 0.9
27
             Mutation rate = 0.8
28
             Mu_oper_type = 1
29
             vessel\_move\_way = 1
30
            coefficient for Obj1= 0.5
            coefficient for Obj2= 1.5
31
32
33
     Iteration begin:
34
35
     Beging the No. 0 iteration:
36
         obj[0] = 18.00
                                temp_best_value_gen = 18.00
37
         The No. 0 iteration is finished!
38
39
     Beging the No. 1 iteration:
40
         obj[gen-1] = 18.00 temp_best_value_gen = 18.00
41
         No, maintain solution and obj[gen] = 18.00, and the tolerance_counter = 1
42
         solution chromosome =
43
             first level: [ [2. 8.]
            second level: [8, 1,]
44
            third level: [4. 7.]]
45
46
         The No. 1 iteration is finished!
48
     Beging the No. 2 iteration:
         obj[gen-1] = 18.00 temp_best_value_gen = 18.00
49
50
         No, maintain solution and obj[gen] = 18.00, and the tolerance_counter = 2
51
         solution chromosome =
             first level: [ [2. 8.]
52
             second level: [8. 1.]
53
54
            third level: [4. 7.]]
55
         The No. 2 iteration is finished!
56
57
     Beging the No. 3 iteration:
58
         obi[gen-1] = 18.00 temp best value gen = 18.00
59
         No, maintain solution and obj[gen] = 18.00, and the tolerance_counter = 3
60
         solution chromosome =
61
             first level: [ [2. 8.]
62
             second level: [8. 1.]
            third level: [4. 7.]]
63
         The No. 3 iteration is finished!
64
65
     Beging the No. 4 iteration:
66
67
         obj[gen-1] = 18.00 temp_best_value_gen = 18.00
68
         No, maintain solution and obj[gen] = 18.00, and the tolerance_counter = 4
69
         solution chromosome =
70
            first level: [ [2. 8.]
71
             second level: [8. 1.]
            third level: [4. 7.]
73
         The No. 4 iteration is finished!
74
75
     Beging the No. 5 iteration:
         obj[gen-1] = 18.00 temp_best_value_gen = 18.00
76
         No, maintain solution and obj[gen] = 18.00, and the tolerance counter = 5
77
78
         solution chromosome =
             first level: [ [2. 8.]
```

```
unknown
  80
           second level: [8. 1.]
  81
           third level: [4. 7.]]
  82
        The No. 5 iteration is finished!
 83
      Beging the No. 6 iteration:
        obj[gen-1] = 18.00 temp_best_value_gen = 18.00
No, maintain solution and obj[gen] = 18.00, and the tolerance_counter = 6
  85
  86
  87
        solution chromosome =
  88
           first level: [ [2. 8.]
           second level: [8, 1,]
  89
  90
           third level: [4. 7.]]
  91
        The No. 6 iteration is finished!
  92
  93 Beging the No. 7 iteration:
 94
        obj[gen-1] = 18.00 temp\_best\_value\_gen = 18.00
  95
        No, maintain solution and obj[gen] = 18.00, and the tolerance_counter = 7
  96
        solution chromosome =
 97
           first level: [ [2. 8.]
 98
           second level: [8. 1.]
           third level: [4. 7.]]
 99
100
        The No. 7 iteration is finished!
101
102
      Beging the No. 8 iteration:
        obj[gen-1] = 18.00 temp best value gen = 18.00
103
104
        No, maintain solution and obj[gen] = 18.00, and the tolerance_counter = 8
105
        solution chromosome =
106
           first level: [ [2. 8.]
107
           second level: [8. 1.]
           third level: [4. 7.]
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: [ [2. 8.]
116
           second level: [8. 1.]
117
           third level: [4. 7.]
118
        Objective function values and some other indicators:
           Obj0 = 9.00
                                  Obj1 = 9.00
                                                         Obj0 + Obj1 = 18.00
119
           Total movement of crane: 0.00
120
           Total waiting time in berth position: 9.00
121
           Total index of q during berthing: 51.00
122
123
         Specific arrangement for each vessel:
124
                               li: 4.0
                                                                        bow of i: 0.0
                                                                                                    tail of i: 4.0
           V_id: 0
                                                    xi: 2.0
                                                                                                                              gama_i0: 8.0
                                                                                                                                                          gama_i1: 10.0
                     duration\_time\_i{:}~2.0
                                                         demand_i: 160.0
                                                                                        work load_i: 160.0
                                                                                                                         work load gap_i: 0
125
                                                                        bow of i: 4.0
                                                                                                    tail of i: 12.0
                                                                                                                                gama_i0: 1.0
           V_id: 1
                               li: 8.0
                                                    xi: 8.0
                                                                                                                                                             gama_i1: 2.0
                     duration_time_i: 1.0
                                                         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
```