```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=27331
3
   import sys; print('Python %s on %s' % (sys.version, sys.platform))
   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 = 36
21
       Pop\_size = 30
       Tolerance iteration unchanged number = 6
23
       Chrom size = 6
       Iter_num_GA = 300
24
25
       Select_rate = 0.8
26
       Crossover rate = 0.8
27
       Mutation rate = 0.8
28
       Mu_oper_type = 2
29
       vessel_move_way = 2
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] = 5.53 temp_best_value_gen = 5.53
36
37
     The No. 0 iteration is finished!
38
39
   Beging the No. 1 iteration:
40
     obj[gen-1] = 5.53 temp_best_value_gen = 5.53
41
     No, maintain solution and obj[gen] = 5.53, and the tolerance_counter = 1
42
     solution chromosome =
43
       first level: [ [2. 4.]
       second level: [2. 0.]
44
       third level: [2. 8.]]
45
     The No. 1 iteration is finished!
46
47
48
   Beging the No. 2 iteration:
     obj[gen-1] = 5.53 temp_best_value_gen = 5.53
49
50
     No, maintain solution and obj[gen] = 5.53, and the tolerance_counter = 2
51
     solution chromosome =
       first level: [ [2. 4.]
52
53
       second level: [2. 0.]
54
       third level: [2. 8.]]
55
     The No. 2 iteration is finished!
56
57
   Beging the No. 3 iteration:
58
     obj[gen-1] = 5.53 temp best value gen = 5.53
59
     No, maintain solution and obj[gen] = 5.53, and the tolerance_counter = 3
60
     solution chromosome =
61
       first level: [ [2. 4.]
62
       second level: [2. 0.]
       third level: [2. 8.]]
63
     The No. 3 iteration is finished!
64
65
   Beging the No. 4 iteration:
66
67
     obj[gen-1] = 5.53 temp_best_value_gen = 5.53
68
     No, maintain solution and obj[gen] = 5.53, and the tolerance_counter = 4
69
     solution chromosome =
70
       first level: [ [2. 4.]
       second level: [2. 0.]
71
       third level: [2. 8.]]
73
     The No. 4 iteration is finished!
74
75
   Beging the No. 5 iteration:
     obj[gen-1] = 5.53 temp_best_value_gen = 5.53
76
     No, maintain solution and obj[gen] = 5.53, and the tolerance counter = 5
77
78
     solution chromosome =
       first level: [ [2. 4.]
```

```
80
           second level: [2. 0.]
 81
          third level: [2. 8.]]
 82
        The No. 5 iteration is finished!
 83
     Beging the No. 6 iteration:
       obj[gen-1] = 5.53 temp_best_value_gen = 5.53
No, maintain solution and obj[gen] = 5.53, and the tolerance_counter = 6
 85
 86
 87
        solution chromosome =
 88
          first level: [ [2. 4.]
 89
          second level: [2. 0.]
 90
          third level: [2. 8.]]
 91
        The No. 6 iteration is finished!
 92
 93
 94
 95
    The iteration is terminated and then visulize the solution:
       solution chromosome =
 96
 97
          first level: [ [2. 4.]
 98
          second level: [2. 0.]
 99
          third level: [2. 8.]
100
        Objective function values and some other indicators:
101
          Obj0 = 5.00
                                 Obj1 = 2.02
                                                        Obj0 + Obj1 = 7.02
           Total movement of crane: 0.02
102
103
          Total waiting time in berth position: 2.00
104
          Total index of q during berthing: 19.00
105
        Specific arrangement for each vessel:
106
          V_id: 0
                              li: 4.0
                                                   xi: 2.0
                                                                        bow of i: 0.0
                                                                                                    tail of i: 4.0
                                                                                                                             gama i0: 2.0
                                                                                                                                                         gama_i1: 6.0
                     duration_time_i: 4.0
                                                        demand_i: 160.0
                                                                                       work load_i: 160.0
                                                                                                                        work load gap_i: 0
107
                              li: 8.0
                                                                       bow of i: 0.0
                                                                                                    tail of i: 8.0
           V_id: 1
                                                   xi: 4.0
                                                                                                                             gama_i0: 0.0
                                                                                                                                                          gama_i1: 1.0
                                                        demand_i: 120.0
                     duration_time_i: 1.0
                                                                                       work load_i: 120.0
                                                                                                                        work load gap_i: 0
109 Algorithm finished and the total CPU time: 178 s
110 End
111
```