```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=2686
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 = 20
21
       Pop\_size = 10
       Tolerance iteration unchanged number = 5
23
       Chrom\_size = 6
       Iter_num_GA = 300
24
25
       Select_rate = 0.95
26
       Crossover rate = 0.8
27
       Mutation rate = 0.8
28
       Mu_oper_type = 1
29
       vessel\_move\_way = 1
30
       coefficient for Obj1= 1.9
       coefficient for Obj2= 0.100000000000000009
31
32
33
   Iteration begin:
34
35
   Beging the No. 0 iteration:
     obj[0] = 12.27 temp_best_value_gen = 12.27
36
37
     The No. 0 iteration is finished!
38
39
   Beging the No. 1 iteration:
     obj[gen-1] = 12.27 temp_best_value_gen = 12.27
40
41
     No, maintain solution and obj[gen] = 12.27, and the tolerance_counter = 1
42
     solution chromosome =
43
       first level: [ [2.31 6.51]
       second level: [4, 1,]
44
       third level: [4. 2.]]
45
46
     The No. 1 iteration is finished!
47
48
   Beging the No. 2 iteration:
     obj[gen-1] = 12.27 temp_best_value_gen = 12.27
49
50
     No, maintain solution and obj[gen] = 12.27, and the tolerance_counter = 2
51
     solution chromosome =
52
       first level: [ [2.31 6.51]
53
       second level: [4. 1.]
54
       third level: [4. 2.]]
55
     The No. 2 iteration is finished!
56
57
   Beging the No. 3 iteration:
58
     obi[gen-1] = 12.27 temp best value gen = 12.27
59
     No, maintain solution and obj[gen] = 12.27, and the tolerance_counter = 3
60
     solution chromosome =
61
       first level: [ [2.31 6.51]
62
       second level: [4. 1.]
       third level: [4. 2.]]
63
     The No. 3 iteration is finished!
64
65
   Beging the No. 4 iteration:
66
67
     obj[gen-1] = 12.27 temp_best_value_gen = 12.27
68
     No, maintain solution and obj[gen] = 12.27, and the tolerance_counter = 4
69
     solution chromosome =
70
       first level: [ [2.31 6.51]
       second level: [4. 1.]
71
       third level: [4. 2.]]
73
     The No. 4 iteration is finished!
74
75
   Beging the No. 5 iteration:
     obj[gen-1] = 12.27 temp_best_value_gen = 12.27
76
     No, maintain solution and obj[gen] = 12.27, and the tolerance_counter = 5
77
78
     solution chromosome =
       first level: [ [2.31 6.51]
```

```
unknown
           second level: [4, 1,]
 80
 81
           third level: [4. 2.]]
 82
        The No. 5 iteration is finished!
 83
  84
 85
 86 The iteration is terminated and then visulize the solution:
 87
        solution chromosome =
 88
           first level: [ [2.31 6.51]
          second level: [4. 1.] third level: [4. 2.]]
 89
 90
 91
        Objective function values and some other indicators:
  92
          Obj0 = 5.00
                                 Obj1 = 27.74
                                                       Obj0 + Obj1 = 32.74
 93
           Total movement of crane: 22.74
 94
           Total waiting time in berth position: 5.00
 95
           Total index of q during berthing: 27.00
        Specific arrangement for each vessel:
 96
 97
                              li: 4.0
                                                   xi: 2.3
                                                                      bow of i: 0.3
                                                                                                  tail of i: 4.3
                                                                                                                           gama_i0: 4.0
           V_id: 0
                                                                                                                                                      gama_i1: 6.0
                     duration_time_i: 2.0
                                                       demand_i: 160.0
                                                                                      work load_i: 160.0
                                                                                                                      work load gap_i: 0
 98
           V_id: 1
                              li: 8.0
                                                   xi: 6.5
                                                                      bow of i: 2.5
                                                                                                  tail of i: 10.5
                                                                                                                             gama_i0: 1.0
                                                                                                                                                         gama_i1: 4.0
                     duration_time_i: 3.0
                                                       demand_i: 120.0
                                                                                     work load_i: 120.0
                                                                                                                      work load gap_i: 0
 99
100 Algorithm finished and the total CPU time: 56 s
101 End
102
```