```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=14447
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_3_4 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 = 58
21
       Pop\_size = 30
       Tolerance iteration unchanged number = 10
23
       Chrom size = 9
       Iter_num_GA = 300
24
25
       Select_rate = 0.85
26
       Crossover rate = 0.95
       Mutation rate = 0.95
27
28
       Mu_oper_type = 1
29
       vessel\_move\_way = 2
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] = 3.80 temp_best_value_gen = 3.80
36
37
     The No. 0 iteration is finished!
38
39
   Beging the No. 1 iteration:
     obj[gen-1] = 3.80 temp_best_value_gen = 3.80
40
41
     No, maintain solution and obj[gen] = 3.80, and the tolerance_counter = 1
42
     solution chromosome =
43
       first level: [ [ 4. 10. 15.5]
       second level: [0. 0. 0.]
44
       third level: [7. 4. 2.]]
45
46
     The No. 1 iteration is finished!
47
48
   Beging the No. 2 iteration:
obj[gen-1] = 3.80 temp_best_value_gen = 3.80
49
50
     No, maintain solution and obj[gen] = 3.80, and the tolerance_counter = 2
51
     solution chromosome =
52
       first level: [ [ 4. 10. 15.5]
53
       second level: [0. 0. 0.]
54
       third level: [7. 4. 2.]]
55
     The No. 2 iteration is finished!
56
57
   Beging the No. 3 iteration:
58
     obj[gen-1] = 3.80 temp best value gen = 3.80
59
     No, maintain solution and obj[gen] = 3.80, and the tolerance_counter = 3
60
     solution chromosome =
61
       first level: [ [ 4. 10. 15.5]
       second level: [0. 0. 0.] third level: [7. 4. 2.]]
62
63
     The No. 3 iteration is finished!
64
65
   Beging the No. 4 iteration:
66
67
     obj[gen-1] = 3.80 temp_best_value_gen = 3.80
68
     No, maintain solution and obj[gen] = 3.80, and the tolerance_counter = 4
69
     solution chromosome =
70
       first level: [ [ 4. 10. 15.5]
       second level: [0. 0. 0.]
71
       third level: [7. 4. 2.]]
73
     The No. 4 iteration is finished!
74
75
   Beging the No. 5 iteration:
     obj[gen-1] = 3.80 temp best value gen = 3.80
76
     No, maintain solution and obj[gen] = 3.80, and the tolerance_counter = 5
77
78
     solution chromosome =
       first level: [ [ 4. 10. 15.5]
```

```
80
          second level: [0. 0. 0.]
 81
          third level: [7. 4. 2.]]
 82
        The No. 5 iteration is finished!
 83
     Beging the No. 6 iteration:
       obj[gen-1] = 3.80 temp_best_value_gen = 3.80
No, maintain solution_and_obj[gen] = 3.80, and the tolerance_counter = 6
 85
 86
 87
        solution chromosome =
 88
          first level: [ [ 4. 10. 15.5]
          second level: [0. 0. 0.]
 89
 90
          third level: [7. 4. 2.]]
 91
        The No. 6 iteration is finished!
 92
 93
     Beging the No. 7 iteration:
 94
       obj[gen-1] = 3.80 temp_best_value_gen = 3.80
 95
        No, maintain solution and obj[gen] = 3.80, and the tolerance_counter = 7
 96
       solution chromosome =
 97
          first level: [ [ 4. 10. 15.5]
 98
          second level: [0. 0. 0.]
          third level: [7. 4. 2.]]
99
100
       The No. 7 iteration is finished!
101
102
     Beging the No. 8 iteration:
       obj[gen-1] = 3.80 temp best value gen = 3.80
103
104
       No, maintain solution and obj[gen] = 3.80, and the tolerance_counter = 8
105
        solution chromosome =
          first level: [ [ 4. 10. 15.5]
106
107
          second level: [0. 0. 0.]
          third level: [7. 4. 2.]]
108
109
        The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112
       obj[gen-1] = 3.80 temp_best_value_gen = 3.80
113
        No, maintain solution and obj[gen] = 3.80, and the tolerance_counter = 9
114
       solution chromosome =
115
          first level: [ [ 4. 10. 15.5]
116
          second level: [0. 0. 0.]
          third level: [7. 4. 2.]]
117
118
       The No. 9 iteration is finished!
119
120 Beging the No. 10 iteration:
121
       obj[gen-1] = 3.80  temp_best_value_gen = 3.80
       No, maintain solution and obj[gen] = 3.80, and the tolerance_counter = 10
122
123
        solution chromosome =
124
          first level: [ [ 4. 10. 15.5]
          second level: [0. 0. 0.]
125
126
          third level: [7. 4. 2.]]
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: [[4. 10. 15.5]
133
134
          second level: [0. 0. 0.]
135
          third level: [7. 4. 2.]]
136
       Objective function values and some other indicators:
                                                       Obj0 + Obj1 = 2.00
137
          Obj0 = 2.00
                                 Obj1 = 0.00
138
          Total movement of crane: 0.00
139
          Total waiting time in berth position: 0.00
140
          Total index of q during berthing: 148.00
141
        Specific arrangement for each vessel:
                             li: 8.0
                                                                                                                            gama i0: 0.0
142
          V_id: 0
                                                  xi: 4.0
                                                                       bow of i: 0.0
                                                                                                  tail of i: 8.0
                                                                                                                                                        gama i1: 1.0
                    duration_time_i: 1.0
                                                       demand_i: 140.0
                                                                                      work load_i: 140.0
                                                                                                                       work load gap_i: 0
143
          V_id: 1
                                                                         bow of i: 8.0
                                                                                                                                 gama_i0: 0.0
                              li: 4.0
                                                   xi: 10.0
                                                                                                     tail of i: 12.0
                                                                                                                                                             gama_i1: 2
                       duration_time_i: 2.0
                                                          demand_i: 140.0
                                                                                         work load_i: 140.0
                                                                                                                          work load gap_i: 0
                                                                         bow of i: 12.0
144
          V id: 2
                              1i: 7.0
                                                  xi: 15.5
                                                                                                     tail of i: 19.0
                                                                                                                                 gama i0: 0.0
                                                                                                                                                             gama i1:3
                       duration_time_i: 3.0
                                                          demand_i: 100.0
                                                                                         work load i: 100.0
                                                                                                                         work load gap_i: 0
145
146 Algorithm finished and the total CPU time: 585 s
147 End
148
```