```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=15392
2
3
   import sys; print('Python %s on %s' % (sys.version, sys.platform))
   01_My_Python_Code'])
5
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.
12
13
  This is the R_3_8 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] = 6.30 temp_best_value_gen = 6.30
36
37
     The No. 0 iteration is finished!
38
39
   Beging the No. 1 iteration:
40
     obj[gen-1] = 6.30 temp_best_value_gen = 6.10
     Yes, update solution and obj[gen] = 6.10
41
     solution chromosome =
42
       first level: [ [ 4.5 17. 12. ]
43
       second level: [2. 2. 0.]
44
       third level: [2. 4. 3.]]
45
46
     The No. 1 iteration is finished!
47
48
   Beging the No. 2 iteration:
     obj[gen-1] = 6.10 temp_best_value_gen = 6.10
49
50
     No, maintain solution and obj[gen] = 6.10, and the tolerance_counter = 1
51
     solution chromosome =
52
       first level: [ [ 4.5 17. 12. ]
53
       second level: [2. 2. 0.]
54
       third level: [2. 4. 3.]]
55
     The No. 2 iteration is finished!
56
57
   Beging the No. 3 iteration:
58
     obi[gen-1] = 6.10 temp best value gen = 6.10
59
     No, maintain solution and obj[gen] = 6.10, and the tolerance_counter = 2
60
     solution chromosome =
61
       first level: [ [ 4.5 17. 12. ]
62
       second level: [2. 2. 0.]
63
       third level: [2. 4. 3.]]
     The No. 3 iteration is finished!
64
65
   Beging the No. 4 iteration:
66
67
     obj[gen-1] = 6.10 temp_best_value_gen = 6.10
68
     No, maintain solution and obj[gen] = 6.10, and the tolerance_counter = 3
69
     solution chromosome =
70
       first level: [ [ 4.5 17. 12. ]
71
       second level: [2. 2. 0.]
       third level: [2. 4. 3.]]
73
     The No. 4 iteration is finished!
74
75
   Beging the No. 5 iteration:
     obi[gen-1] = 6.10 temp best value gen = 6.10
76
     No, maintain solution and obj[gen] = 6.10, and the tolerance_counter = 4
77
78
     solution chromosome =
       first level: [ [ 4.5 17. 12. ]
```

```
80
          second level: [2. 2. 0.]
 81
          third level: [2. 4. 3.]]
        The No. 5 iteration is finished!
 82
 83
     Beging the No. 6 iteration:
 85
       obj[gen-1] = 6.10 temp best value gen = 6.10
       No, maintain solution and obj[gen] = 6.10, and the tolerance_counter = 5
 86
 87
        solution chromosome =
 88
          first level: [ [ 4.5 17. 12. ]
 89
          second level: [2. 2. 0.]
 90
          third level: [2. 4. 3.]]
 91
        The No. 6 iteration is finished!
 92
 93 Beging the No. 7 iteration:
 94
       obj[gen-1] = 6.10 temp_best_value_gen = 6.10
 95
        No, maintain solution and obj[gen] = 6.10, and the tolerance_counter = 6
 96
       solution chromosome =
 97
          first level: [ [ 4.5 17. 12. ]
 98
          second level: [2. 2. 0.]
 99
          third level: [2. 4. 3.]]
100
       The No. 7 iteration is finished!
101
102
     Beging the No. 8 iteration:
       obj[gen-1] = 6.10 temp best value gen = 6.10
103
104
       No, maintain solution and obj[gen] = 6.10, and the tolerance_counter = 7
105
        solution chromosome =
          first level: [ [ 4.5 17. 12. ]
106
          second level: [2. 2. 0.]
107
108
          third level: [2. 4. 3.]]
109
        The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112
        obj[gen-1] = 6.10 temp_best_value_gen = 6.10
113
        No, maintain solution and obj[gen] = 6.10, and the tolerance_counter = 8
114
       solution chromosome =
115
          first level: [ [ 4.5 17. 12. ]
116
          second level: [2. 2. 0.]
          third level: [2, 4, 3,]]
117
118
       The No. 9 iteration is finished!
119
120 Beging the No. 10 iteration:
121
       obj[gen-1] = 6.10 temp_best_value_gen = 6.10
122
       No, maintain solution and obj[gen] = 6.10, and the tolerance_counter = 9
123
        solution chromosome =
124
          first level: [ [ 4.5 17. 12. ]
125
          second level: [2. 2. 0.]
126
          third level: [2. 4. 3.]]
127
        The No. 10 iteration is finished!
128
129
     Beging the No. 11 iteration:
130
        obj[gen-1] = 6.10 temp_best_value_gen = 6.10
131
       No, maintain solution and obj[gen] = 6.10, and the tolerance_counter = 10
132
       solution chromosome =
          first level: [ [ 4.5 17. 12. ]
133
134
          second level: [2. 2. 0.]
135
          third level: [2. 4. 3.]]
136
       The No. 11 iteration is finished!
137
138
139
140 The iteration is terminated and then visulize the solution:
141
       solution chromosome =
142
          first level: [ [ 4.5 17. 12. ]
          second level: [2. 2. 0.] third level: [2. 4. 3.]
143
144
145
        Objective function values and some other indicators:
                                                       Obj0 + Obj1 = 7.00
146
          Obj0 = 3.00
                                 Obj1 = 4.00
          Total movement of crane: 0.00
147
148
          Total waiting time in berth position: 4.00
149
          Total index of q during berthing: 112.00
150
        Specific arrangement for each vessel:
151
          V_id: 0
                              li: 9.0
                                                  xi: 4.5
                                                                      bow of i: 0.0
                                                                                                  tail of i: 9.0
                                                                                                                           gama_i0: 2.0
                                                                                                                                                       gama_i1: 4.0
                    duration_time_i: 2.0
                                                       demand_i: 60.0
                                                                                     work load_i: 60.0
                                                                                                                      work load gap_i: 0
152
          V id: 1
                              li: 6.0
                                                                         bow of i: 14.0
                                                                                                    tail of i: 20.0
                                                                                                                                gama i0: 2.0
                                                                                                                                                            gama_i1: 3
                                                  xi: 17.0
                                                         demand_i: 60.0
                                                                                       work load_i: 60.0
                                                                                                                         work load gap_i: 0
     .0
                       duration_time_i: 1.0
153
                                                                        bow of i: 10.0
          V id: 2
                              li: 4.0
                                                  xi: 12.0
                                                                                                    tail of i: 14.0
                                                                                                                                gama i0: 0.0
                                                                                                                                                            gama i1:2
     .0
                       duration_time_i: 2.0
                                                          demand_i: 120.0
                                                                                       work load_i: 120.0
                                                                                                                         work load gap_i: 0
154
155\,\, Algorithm finished and the total CPU time: 419 s
156 End
157
```