```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=6620
2
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_6_4 standard_test.xlsx optimization process solved by ENSGA-II algorithm.
14
15
   Start
16
17
   Before iteration:
     Read basic data
18
19
     Parameter setting:
20
       trail = 58
21
       Pop\_size = 30
       Tolerance iteration unchanged number = 10
23
       Chrom\_size = 18
       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] = 17.10 temp_best_value_gen = 17.10
36
     The No. 0 iteration is finished!
37
38
39
   Beging the No. 1 iteration:
     obj[gen-1] = 17.10 temp_best_value_gen = 17.10
40
     No, maintain solution and obj[gen] = \overline{17.10}, and the tolerance_counter = 1
41
42
     solution chromosome =
43
       first level: [[1.5 7. 15.5 24. 28.5 2.5]
       second level: [5. 5. 1. 2. 0. 1.]
44
       third level: [3. 6. 9. 3. 2. 2.]]
45
46
     The No. 1 iteration is finished!
47
48
   Beging the No. 2 iteration:
     obj[gen-1] = 17.10 temp_best_value_gen = 17.10
49
50
     No, maintain solution and obj[gen] = 17.10, and the tolerance_counter = 2
51
     solution chromosome =
       first level: [ [ 1.5 7. 15.5 24. 28.5 2.5]
52
53
       second level: [5. 5. 1. 2. 0. 1.]
54
       third level: [3. 6. 9. 3. 2. 2.]]
55
     The No. 2 iteration is finished!
56
57
   Beging the No. 3 iteration:
58
     obi[gen-1] = 17.10 temp best value gen = 16.20
     Yes, update solution and obj[gen] = 16.20
59
60
     solution chromosome =
61
       first level: [ [ 1.5 7. 15.5 26. 24. 2.5]
62
       second level: [5. 4. 0. 0. 4. 1.]
63
       third level: [3. 8. 9. 2. 3. 2.]]
     The No. 3 iteration is finished!
64
65
   Beging the No. 4 iteration:
66
67
     obj[gen-1] = 16.20 temp_best_value_gen = 16.20
68
     No, maintain solution and obj[gen] = 16.20, and the tolerance_counter = 1
69
     solution chromosome =
       first level: [ [ 1.5 7. 15.5 26. 24. 2.5]
70
71
       second level: [5. 4. 0. 0. 4. 1.]
       third level: [3. 8. 9. 2. 3. 2.]]
73
     The No. 4 iteration is finished!
74
75
   Beging the No. 5 iteration:
     obi[gen-1] = 16.20 temp best value gen = 16.20
76
     No, maintain solution and obj[gen] = 16.20, and the tolerance_counter = 2
77
78
     solution chromosome =
       first level: [ [ 1.5 7. 15.5 26. 24. 2.5]
```

```
second level: [5. 4. 0. 0. 4. 1.]
 80
 81
          third level: [3. 8. 9. 2. 3. 2.]]
 82
        The No. 5 iteration is finished!
 83
     Beging the No. 6 iteration:
 85
       obj[gen-1] = 16.20 temp best value gen = 16.20
       No, maintain solution and obj[gen] = \overline{16.20}, and the tolerance_counter = 3
 86
 87
        solution chromosome =
 88
          first level: [ [ 1.5 7. 15.5 26. 24. 2.5]
 89
          second level: [5. 4. 0. 0. 4. 1.]
 90
          third level: [3. 8. 9. 2. 3. 2.]]
 91
        The No. 6 iteration is finished!
 92
 93 Beging the No. 7 iteration:
        obj[gen-1] = 16.20 temp_best_value_gen = 16.20
 94
 95
        No, maintain solution and obj[gen] = 16.20, and the tolerance_counter = 4
 96
       solution chromosome =
 97
          first level: [ [ 1.5 7. 15.5 26. 24. 2.5]
 98
          second level: [5. 4. 0. 0. 4. 1.]
 99
          third level: [3. 8. 9. 2. 3. 2.]]
100
       The No. 7 iteration is finished!
101
     Beging the No. 8 iteration:
102
       obj[gen-1] = 16.20 temp best value gen = 16.20
103
104
       No, maintain solution and obj[gen] = 16.20, and the tolerance_counter = 5
105
        solution chromosome =
          first level: [ [ 1.5 7. 15.5 26. 24. 2.5]
106
107
          second level: [5. 4. 0. 0. 4. 1.]
108
          third level: [3. 8. 9. 2. 3. 2.]]
109
       The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112
        obj[gen-1] = 16.20 temp_best_value_gen = 16.20
113
        No, maintain solution and obj[gen] = 16.20, and the tolerance_counter = 6
114
       solution chromosome =
115
          first level: [ [ 1.5 7. 15.5 26. 24. 2.5]
116
          second level: [5. 4. 0. 0. 4. 1.]
          third level: [3. 8. 9. 2. 3. 2.]]
117
118
       The No. 9 iteration is finished!
119
120 Beging the No. 10 iteration:
121
       obj[gen-1] = 16.20 temp_best_value_gen = 16.20
122
       No, maintain solution and obj[gen] = 16.20, and the tolerance_counter = 7
123
        solution chromosome =
124
          first level: [ [ 1.5 7. 15.5 26. 24. 2.5]
125
          second level: [5. 4. 0. 0. 4. 1.]
126
          third level: [3. 8. 9. 2. 3. 2.]]
127
        The No. 10 iteration is finished!
128
129 Beging the No. 11 iteration:
        obj[gen-1] = 16.20 temp_best_value_gen = 16.20
130
131
       No, maintain solution and obj[gen] = 16.20, and the tolerance_counter = 8
132
       solution chromosome =
          first level: [ [ 1.5 7. 15.5 26. 24. 2.5]
133
134
          second level: [5. 4. 0. 0. 4. 1.]
135
          third level: [3. 8. 9. 2. 3. 2.]]
136
       The No. 11 iteration is finished!
137
138 Beging the No. 12 iteration:
139
       obj[gen-1] = 16.20 temp_best_value_gen = 16.20
140
       No, maintain solution and obj[gen] = 16.20, and the tolerance_counter = 9
141
        solution chromosome =
142
          first level: [ [ 1.5 7. 15.5 26. 24. 2.5]
143
          second level: [5. 4. 0. 0. 4. 1.]
          third level: [3. 8. 9. 2. 3. 2.]]
144
145
        The No. 12 iteration is finished!
146
147
148
149 The iteration is terminated and then visulize the solution:
150
       solution chromosome =
          first level: [ [ 1.5 7. 15.5 26. 24. 2.5]
151
152
          second level: [5. 4. 0. 0. 4. 1.]
153
          third level: [3. 8. 9. 2. 3. 2.]]
154
        Objective function values and some other indicators:
155
                                Obj1 = 29.00
          Obj0 = 7.00
                                                       Obj0 + Obj1 = 36.00
156
          Total movement of crane: 15.00
157
          Total waiting time in berth position: 14.00
158
          Total index of q during berthing: 400.00
159
        Specific arrangement for each vessel:
160
          V id: 0
                              li: 3.0
                                                  xi: 1.5
                                                                      bow of i: 0.0
                                                                                                  tail of i: 3.0
                                                                                                                           gama i0: 5.0
                                                                                                                                                       gama i1: 8.0
                                                                                     work load i: 160.0
                    duration_time_i: 3.0
                                                       demand_i: 160.0
                                                                                                                      work load gap_i: 0
          V_id: 1
                                                                      bow of i: 3.0
                                                                                                  tail of i: 11.0
161
                              li: 8.0
                                                  xi: 7.0
                                                                                                                             gama_i0: 4.0
                                                                                                                                                         gama_i1: 5.0
                    duration_time_i: 1.0
                                                       demand i: 160.0
                                                                                     work load_i: 160.0
                                                                                                                      work load gap_i: 0
```

unknow	/n						
162	V_id: 2	li: 9.0	xi: 15.5	bow of i: 11.0	0 tail of i: 20.0	gama_i0: 0.0	gama_i1: 1
.0	)	duration_time_i: 1.0	demand	l_i: 120.0	work load_i: 120.0	work load gap_i: 0	
163	V_id: 3	1i: 8.0	xi: 26.0	bow of i: 22.0	0 tail of i: 30.0	gama_i0: 0.0	gama_i1: 4
.0	)	duration_time_i: 4.0	demand	l_i: 160.0	work load_i: 160.0	work load gap_i: 0	
164	V_id: 4	li: 3.0	xi: 24.0	bow of i: 22.5	5 tail of i: 25.5	gama_i0: 4.0	gama_i1: 6
.0	)	duration_time_i: 2.0	demand	l_i: 80.0	work load_i: 80.0	work load gap_i: 0	
165	V_id: 5	li: 5.0	xi: 2.5	bow of i: 0.0	tail of i: 5.0	gama_i0: 1.0	gama_i1: 4.0
		duration_time_i: 3.0	demand_i	: 120.0 v	work load_i: 120.0	work load gap_i: 0	
166							
167 A	167 Algorithm finished and the total CPU time: 1243 s						
168 E	ind						
169							