```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=53877
 3
   import sys; print('Python %s on %s' % (sys.version, sys.platform))
   01 My Python Code', 'E:/1 0000/3 00000/1 000000/1 0000000/1 000000 0000/1 LW 00002/6 0000/2 python code/
   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
   □□□/2 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_1 _standard_test.xlsx optimization process.
14
15
   Start
     Read basic data
16
17
        V = 6
18
       T = 36
       Q = 23
19
       L = 30
20
21
     PSO parameter setting:
        Trail = 16
23
       maxIter num = 10
24
        W inertia = 0.5
25
       oder_type_num = 10
26
       c1 = 1.0
       c2 = 1.0
27
28
       r1 = 0.8767760480677834
29
       r2 = 0.8767760480677834
30 Begin iteration:
31
32
   iter = 0
33
       cord individul obj[indivial i, :] = \begin{bmatrix} 0. & 3.156.159. \end{bmatrix}
       cord_individul_obj[indivial_i, :] = [ 1. 3. 164. 167.]
34
        cord_individul_obj[indivial_i, :] = [ 2.
35
                                           3. 100. 103.]
36
       cord_individul_obj[indivial_i, :] = [ 3. 3. 132. 135.]
       cord individul_obj[indivial_i, :] = [ 4. 3. 72. 75.]
37
       cord_individul_obj[indivial_i, :] = [5. 3. 86. 89.]
38
39
        cord_individul_obj[indivial_i, :] = [ 6. 3. 120. 123.]
40
       cord_individul_obj[indivial_i, :] = [ 7. 3. 158. 161.]
       cord_individul_obj[indivial_i, :] = [ 8. 3. 106. 109.]
41
       cord_individul_obj[indivial_i, :] = [ 9. 3. 104. 107.]
42
43
44
     min(cord\ individul\ obi[:, 3]) = 75.0
45
     historl_G_best_iter[iter, 3] = 75.0
46
   Begin iteration:
47
48 iter = 1
49
       cord_individul_obj[indivial_i, :] = [0. 4. 76. 80.]
50
       cord_individul_obj[indivial_i, :] = [1. 3. 72. 75.]
       cord_individul_obj[indivial_i, :] = [2, 4, 30, 34]
51
       cord individul obj[indivial i, :] = [3. 4. 66. 70.]
52
53
        cord_individul_obj[indivial_i, :] = [4. 4. 74. 78.]
54
       cord_individul_obj[indivial_i, :] = [5. 4. 42. 46.]
       cord individul_obj[indivial_i, :] = [6. 4. 44. 48.]
55
       cord_individul_obj[indivial_i, :] = [ 7. 4. 66. 70.]
56
        cord_individul_obj[indivial_i, :] = [ 8. 4. 30. 34.]
57
58
       cord individul obj[indivial i, :] = \begin{bmatrix} 9 & 3.112.115. \end{bmatrix}
59
60
     min(cord\_individul\_obj[:, 3]) = 34.0
     historl\_G\_best\_iter[iter, 3] = 34.0
62
   Begin iteration:
63
64
   iter = 2
       cord_individul_obj[indivial_i, :] = [ 0. 6. 88. 94.] cord_individul_obj[indivial_i, :] = [ 1. 4. 78. 82.]
65
66
       cord_individul_obj[indivial_i, :] = [2. 6. 16. 22.]
cord_individul_obj[indivial_i, :] = [3. 5. 104. 109.]
67
68
       cord individul obj[indivial i, :] = [4.6.36.42.]
69
70
       cord_individul_obj[indivial_i, :] = [5. 6. 44. 50.]
71
        cord_individul_obj[indivial_i, :] = [6. 4. 44. 48.]
       cord_individul_obj[indivial_i, :] = [ 7. 6. 118. 124.]
73
       cord_individul_obj[indivial_i, :] = [8. 6. 52. 58.]
74
       cord_individul_obj[indivial_i, :] = [9. 4. 30. 34.]
75
76
     min(cord\ individul\ obj[:, 3]) = 22.0
     historl_G_best_iter[iter, 3] = 22.0
77
78 Begin iteration:
```

```
80 iter = 3
 81
          cord_individul_obj[indivial_i, :] = [ 0. 5. 32. 37.]
          cord_individul_obj[indivial_i, :] = [ 1. 6. 8. 14.]
 82
 83
          cord_individul_obj[indivial_i, :] = [2. 6. 12. 18.]
 84
          cord individul obj[indivial i, :] = [3. 4.32.36.]
 85
          cord_individul_obj[indivial_i, :] = [ 4. 3. 114. 117.]
          cord_individul_obj[indivial_i, :] = [5. 3. 94. 97.]
 86
 87
          cord_individul_obj[indivial_i, :] = [6. 4. 30. 34.]
 88
          cord_individul_obj[indivial_i, :] = [ 7. 6. 16. 22.]
          cord_individul_obj[indivial_i, :] = [ 8. 4. 122. 126.]
 89
 90
          cord_individul_obj[indivial_i, :] = [9. 6. 8. 14.]
 91
 92
        min(cord\ individul\ obj[:, 3]) = 14.0
 93
        historl\_G\_best\_iter[iter, 3] = 14.0
 94 Begin iteration:
 95
 96
     iter = 4
 97
          cord_individul_obj[indivial_i, :] = [0. 5. 56. 61.]
          cord_individul_obj[indivial_i, :] = [ 1. 5. 92. 97.]
 98
 99
          cord individul obj[indivial i, :] = [2. 4.28.32.]
100
          cord_individul_obj[indivial_i, :] = [3. 6. 48. 54.]
101
          cord_individul_obj[indivial_i, :] = [4. 5. 40. 45.]
102
          cord_individul_obj[indivial_i, :] = [5. 6. 48. 54.]
          cord individul obj[indivial i, :] = [6.6.12.18.]
103
          cord_individul_obj[indivial_i, :] = [7. 6. 64. 70.]
104
105
          cord_individul_obj[indivial_i, :] = [ 8. 6. 8. 14.]
          cord_individul_obj[indivial_i, :] = [9. 6. 48. 54.]
106
107
108
        min(cord\_individul\_obj[:, 3]) = 14.0
109
       historl\_G\_best\_iter[iter, 3] = 14.0
110 Begin iteration:
111
112 \text{ iter} = 5
          cord_individul_obj[indivial_i, :] = [0. 6.112.118.]
113
          cord_individul_obj[indivial_i, :] = [1. 6. 8. 14.]
114
          cord_individul_obj[indivial_i, :] = [2. 4. 28. 32.]
115
116
          cord_individul_obj[indivial_i, :] = [3. 6. 48. 54.]
          cord individul obj[indivial i, :] = [4.6.40.46.]
117
118
          cord_individul_obj[indivial_i, :] = [5. 5. 68. 73.]
119
          cord_individul_obj[indivial_i, :] = [6. 6. 12. 18.]
120
          cord_individul_obj[indivial_i, :] = [7. 5. 40. 45.]
          cord_individul_obj[indivial_i, :] = [ 8. 6. 32. 38.]
121
          cord_individul_obj[indivial_i, :] = [ 9. 6. 48. 54.]
122
123
        min(cord\_individul\_obj[:, 3]) = 14.0
124
       historl G_{best_{iter}[iter, 3]} = 14.0
125
126 Begin iteration:
127
128 iter = 6
          cord\_individul\_obj[indivial\_i, :] = [0. 6. 8. 14.]
129
          cord_individul_obj[indivial_i, :] = [ 1. 4. 72. 76.]
130
131
          cord_individul_obj[indivial_i, :] = [2. 4. 70. 74.]
132
          cord\_individul\_obj[indivial\_i, :] = [3. 6. 48. 54.]
          cord_individul_obj[indivial_i, :] = [4. 5. 12. 17.]
133
134
          cord_individul_obj[indivial_i, :] = [5. 6. 24. 30.]
135
          cord_individul_obj[indivial_i, :] = [6. 6. 12. 18.]
          cord individul obj[indivial i, :] = [7. 6. 20. 26.]
136
137
          cord_individul_obj[indivial_i, :] = [ 8. 5. 12. 17.]
138
          cord_individul_obj[indivial_i, :] = [ 9. 6. 94. 100.]
139
140
        min(cord\_individul\_obj[:, 3]) = 14.0
141
        historl\_G\_best\_iter[iter, 3] = 14.0
142 Begin iteration:
143
144 \text{ iter} = 7
145
          cord_individul_obj[indivial_i, :] = [0. 5. 24. 29.]
146
          cord_individul_obj[indivial_i, :] = [1. 4. 48. 52.]
          cord_individul_obj[indivial_i, :] = [2. 4. 28. 32.]
147
148
          cord_individul_obj[indivial_i, :] = [ 3. 6. 48. 54.]
149
          cord_individul_obj[indivial_i, :] = [4. 3. 40. 43.]
150
          cord_individul_obj[indivial_i, :] = [ 5. 5. 80. 85.]
151
          cord_individul_obj[indivial_i, :] = [6. 6. 12. 18.]
152
          cord_individul_obj[indivial_i, :] = [7. 6. 40. 46.]
          cord individul obj[indivial i, :] = [8.5.32.37.]
153
154
          cord_individul_obj[indivial_i, :] = [ 9. 6. 8. 14.]
155
156
        min(cord\_individul\_obj[:, 3]) = 14.0
157
       historl\_G\_best\_iter[iter, 3] = 14.0
158 Begin iteration:
159
160 \text{ iter} = 8
          cord_individul_obj[indivial_i, :] = [ 0. 6. 70. 76.]
161
162
          cord_individul_obj[indivial_i, :] = [1. 6. 24. 30.]
          cord_individul_obj[indivial_i, :] = [2. 5. 64. 69.]
163
```

```
164
          cord_individul_obj[indivial_i, :] = [3. 6. 48. 54.]
165
          cord individul obj[indivial i, :] = [4.6.12.18.]
          cord individul_obj[indivial_i, :] = [5. 6. 8. 14.]
166
167
          cord_individul_obj[indivial_i, :] = [6. 6. 12. 18.]
168
          cord_individul_obj[indivial_i, :] = [7. 5. 12. 17.]
169
          cord individul obj[indivial i, :] = [8.6.20.26.]
170
          cord_individul_obj[indivial_i, :] = [ 9. 6. 106. 112.]
171
172
       min(cord\ individul\ obj[:, 3]) = 14.0
       historl\_G\_best\_iter[iter, 3] = 14.0
173
174 Begin iteration:
175
176 iter = 9
          cord_individul_obj[indivial_i, :] = [0. 3.116.119.]
177
178
          cord_individul_obj[indivial_i, :] = [ 1. 5. 8. 13.]
179
          cord_individul_obj[indivial_i, :] = [2. 5. 38. 43.]
          cord individul_obj[indivial_i, :] = [3. 6. 8. 14.]
180
          cord individul_obj[indivial_i, :] = [ 4. 5. 54. 59.]
181
182
          cord_individul_obj[indivial_i, :] = [ 5. 6. 106. 112.]
183
          cord individul obj[indivial i, :] = [6. 6. 8. 14.]
184
          cord_individul_obj[indivial_i, :] = [7. 6. 32. 38.]
          cord\_individul\_obj[indivial\_i, :] = [8.5.38.43.]
185
186
          cord_individul_obj[indivial_i, :] = [9. 6. 8. 14.]
187
188
       min(cord\_individul\_obj[:, 3]) = 13.0
189
       historl_G_best_iter[iter, 3] = 13.0
190 Begin iteration:
191
     iter = 10
192
193
          cord_individul_obj[indivial_i, :] = [ 0. 5. 8. 13.]
194
          cord individul obj[indivial i, :] = [1. 6.74.80.]
195
          cord individul obj[indivial i, :] = [2. 6. 12. 18.]
196
          cord_individul_obj[indivial_i, :] = [3. 4. 24. 28.]
197
          cord_individul_obj[indivial_i, :] = [4. 6. 12. 18.]
          cord individul obj[indivial i, :] = [5.6.24.30.]
198
199
          cord_individul_obj[indivial_i, :] = [6. 5. 12. 17.]
200
          cord_individul_obj[indivial_i, :] = [7. 6. 12. 18.]
          cord individul obj[indivial i, :] = [8.6.12.18.]
201
202
          cord_individul_obj[indivial_i, :] = [ 9. 6. 82. 88.]
203
204
        min(cord\_individul\_obj[:, 3]) = 13.0
205
       historl G best_iter[iter, 3] = 13.0
206
     Iteration calculate over
207
208
209
210
211
     All item are in Bin and:
212
       Bin area = 1080
        Real\_area = 105.0
213
214
       215
          BEST_CHROM =
216
            berth: [10.5 26. 20. 2.5 6.5 15.]
217
            time: [0. 0. 0. 0. 0. 0.]
218
            num_QC: [4. 2. 3. 3. 3. 2.]
219
        Objective function values and some other indicators:
                                Obj1 = 8.00
          Obj0 = 5.00
                                                      Obj0 + Obj1 = 13.00
220
          Total movement of crane: 8.00
221
222
          Total waiting time in berth position: 0.00
223
          Total index of q during berthing: 610.00
224
        Specific arrangement for each vessel:
225
                              li: 5.0
                                                 xi: 10.5
                                                                        bow of i: 8.0
                                                                                                   tail of i: 13.0
                                                                                                                              gama i0: 0.0
                                                                                                                                                         gama_i1: 0
           V_id: 0
                      gama i1 + 1: 1.0
                                                    gama i1 - gama i0: 0.0
                                                                                         duration time i: 1.0
                                                                                                                            demand i: 80.0
                                                                                                                                                         work
     load i: 80.0
                              work load gap_i: 0
226
          V_id: 1
                              li: 6.0
                                                 xi: 26.0
                                                                        bow of i: 23.0
                                                                                                   tail of i: 29.0
                                                                                                                              gama_i0: 0.0
                                                                                                                                                         gama_i1: 2
                      gama i1 + 1: 3.0
                                                    gama_i1 - gama_i0: 2.0
                                                                                         duration_time_i: 3.0
                                                                                                                            demand_i: 120.0
                                                                                                                                                         work
     load i: 120.0
                                work load gap_i: 0
227
                              li: 6.0
                                                 xi: 20.0
                                                                        bow of i: 17.0
                                                                                                   tail of i: 23.0
                                                                                                                              gama i0: 0.0
                                                                                                                                                         gama_i1: 4
          V_id: 2
                      gama i1 + 1: 5.0
                                                    gama_i1 - gama_i0: 4.0
                                                                                         duration_time_i: 5.0
                                                                                                                            demand i: 260.0
                                                                                                                                                         work
     load_i: 260.0
                                work load gap_i: 0
228
          V_id: 3
                              1i: 5.0
                                                 xi: 2.5
                                                                     bow of i: 0.0
                                                                                                tail of i: 5.0
                                                                                                                         gama i0: 0.0
                                                                                                                                                    gama i1: 1.0
                    gama_i1 + 1: 2.0
                                                 gama_i1 - gama_i0: 1.0
                                                                                       duration_time_i: 2.0
                                                                                                                         demand_i: 80.0
                                                                                                                                                       work load_i:
                         work load gap_i: 0
229
          V id: 4
                             li: 3.0
                                                 xi: 6.5
                                                                     bow of i: 5.0
                                                                                                tail of i: 8.0
                                                                                                                         gama i0: 0.0
                                                                                                                                                    gama i1: 3.0
                    gama_i1 + 1: 4.0
                                                                                       duration_time_i: 4.0
                                                                                                                         demand\_i{:}\ 200.0
                                                 gama_i1 - gama_i0: 3.0
                                                                                                                                                       work load i:
     200.0
                         work load gap i: 0
230
          V_id: 5
                             li: 4.0
                                                  xi: 15.0
                                                                        bow of i: 13.0
                                                                                                   tail of i: 17.0
                                                                                                                              gama_i0: 0.0
                                                                                                                                                         gama_i1: 5
                      gama_i1 + 1: 6.0
                                                                                         duration_time_i: 6.0
                                                    gama_i1 - gama_i0: 5.0
                                                                                                                           demand_i: 220.0
                                                                                                                                                         work
     load i: 220.0
                                work load gap i: 0
231
232
     Algorithm finished and the total CPU time: 38 s
233 End
234
```