```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=4094
 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 = 30
23
       maxIter_num = 10
24
       W inertia = 0.5
25
       oder_type_num = 10
26
       c1 = 2.0
       c2 = 2.0
27
28
       r1 = 0.1189220767075384
29
       r2 = 0.1189220767075384
30 Begin iteration:
31
32
   iter = 0
33
       cord individul obj[indivial i, :] = [0.5, 34, 39]
       cord_individul_obj[indivial_i, :] = [1. 3. 96. 99.]
34
       cord_individul_obj[indivial_i, :] = [ 2. 4. 44. 48.]
35
36
       cord_individul_obj[indivial_i, :] = [3. 5. 94. 99.]
       cord individul_obj[indivial_i, :] = [4. 5. 62. 67.]
37
       cord_individul_obj[indivial_i, :] = [ 5. 6. 56. 62.]
38
39
       cord_individul_obj[indivial_i, :] = [6. 5. 24. 29.]
40
       cord_individul_obj[indivial_i, :] = [ 7. 5. 142. 147.]
       cord_individul_obj[indivial_i, :] = [8. 3. 24. 27.]
41
       cord_individul_obj[indivial_i, :] = [9. 5. 32. 37.]
42
43
44
     min(cord\ individul\ obi[:, 3]) = 27.0
45
     historl_G_best_iter[iter, 3] = 27.0
46
   Begin iteration:
47
48 iter = 1
49
       cord_individul_obj[indivial_i, :] = [0. 3. 96. 99.]
50
       cord_individul_obj[indivial_i, :] = [ 1. 3. 146. 149.]
       cord_individul_obj[indivial_i, :] = [2. 3. 132. 135.]
51
       cord individul obj[indivial i, :] = \begin{bmatrix} 3. & 4.114.118. \end{bmatrix}
52
53
       cord_individul_obj[indivial_i, :] = [ 4. 3. 108. 111.]
54
       cord_individul_obj[indivial_i, :] = [5. 3. 84. 87.]
       cord_individul_obj[indivial_i, :] = [6. 5. 62. 67.]
55
       cord_individul_obj[indivial_i, :] = [7. 3. 24. 27.]
56
       cord_individul_obj[indivial_i, :] = [8. 4. 62. 66.]
57
58
       cord individul obj[indivial i, :] = [9.5.54.59.]
59
     min(cord\_individul\_obj[:, 3]) = 27.0
60
     historl\_G\_best\_iter[iter, 3] = 27.0
62
   Begin iteration:
63
64
   iter = 2
       cord\ individul\_obj[indivial\_i, :] = [0.4.32.36.]
65
       cord individul_obj[indivial_i, :] = \begin{bmatrix} 1. & 3.24.27. \end{bmatrix}
66
67
       cord_individul_obj[indivial_i, :] = [ 2. 4. 142. 146.]
68
       cord_individul_obj[indivial_i, :] = [3. 3. 86. 89.]
       cord_individul_obj[indivial_i, :] = [4. 3. 38. 41.]
69
70
       cord_individul_obj[indivial_i, :] = [ 5. 3. 98. 101.]
71
       cord_individul_obj[indivial_i, :] = [6. 5. 32. 37.]
       cord_individul_obj[indivial_i, :] = [7. 4. 76. 80.]
73
       cord_individul_obj[indivial_i, :] = [8. 3. 68. 71.]
74
       cord_individul_obj[indivial_i, :] = [ 9. 4. 106. 110.]
75
76
     min(cord\ individul\ obj[:, 3]) = 27.0
     historl_G_best_iter[iter, 3] = 27.0
77
78 Begin iteration:
```

```
80 \text{ iter} = 3
 81
          cord_individul_obj[indivial_i, :] = [ 0. 3. 54. 57.]
          cord\_individul\_obj[indivial\_i, :] = [1. 3.110.113.]
 82
 83
          cord_individul_obj[indivial_i, :] = [2, 3, 24, 27,]
 84
          cord_individul_obj[indivial_i, :] = [ 3. 4. 106. 110.]
          cord_individul_obj[indivial_i, :] = [ 4. 3. 110. 113.] cord_individul_obj[indivial_i, :] = [ 5. 3. 132. 135.]
 85
 86
 87
          cord_individul_obj[indivial_i, :] = [ 6. 3. 68. 71.]
 88
          cord_individul_obj[indivial_i, :] = [7. 3. 94. 97.]
          cord_individul_obj[indivial_i, :] = [ 8. 4. 62. 66.]
 89
 90
          cord_individul_obj[indivial_i, :] = [9. 3. 90. 93.]
 91
 92
        min(cord\ individul\ obj[:, 3]) = 27.0
 93
        historl\_G\_best\_iter[iter, 3] = 27.0
 94 Begin iteration:
 95
 96
     iter = 4
 97
          cord_individul_obj[indivial_i, :] = [ 0. 4. 54. 58.]
          cord_individul_obj[indivial_i, :] = [ 1. 3. 146. 149.]
 98
 99
          cord_individul_obj[indivial_i, :] = [ 2. 4. 94. 98.]
100
          cord_individul_obj[indivial_i, :] = [3. 4. 68. 72.]
101
          cord_individul_obj[indivial_i, :] = [4, 3, 120, 123,]
          cord_individul_obj[indivial_i, :] = [5. 3. 24. 27.]
102
103
          cord individul obj[indivial i, :] = [6.3.32.35.]
          cord_individul_obj[indivial_i, :] = [7. 4. 76. 80.]
104
105
          cord_individul_obj[indivial_i, :] = [ 8. 4. 62. 66.]
          cord_individul_obj[indivial_i, :] = [ 9. 4. 128. 132.]
106
107
108
        min(cord\_individul\_obj[:, 3]) = 27.0
109
       historl_G_best_iter[iter, 3] = 27.0
110 Begin iteration:
111
112 \text{ iter} = 5
          cord_individul_obj[indivial_i, :] = [0. 5. 24. 29.]
113
          cord individul obj[indivial i, :] = [1. 3. 24. 27.]
114
          cord_individul_obj[indivial_i, :] = [2. 4. 60. 64.]
115
116
          cord_individul_obj[indivial_i, :] = [3. 5. 80. 85.]
          cord_individul_obj[indivial_i, :] = [ 4. 5. 62. 67.]
117
          cord_individul_obj[indivial_i, :] = [5. 3. 54. 57.]
118
119
          cord_individul_obj[indivial_i, :] = [6. 4. 30. 34.]
120
          cord_individul_obj[indivial_i, :] = [7. 3. 90. 93.]
121
          cord_individul_obj[indivial_i, :] = [ 8. 3. 24. 27.]
          cord_individul_obj[indivial_i, :] = [ 9. 4. 54. 58.]
122
123
        min(cord\_individul\_obj[:, 3]) = 27.0
124
       historl G_{best_iter[iter, 3]} = 27.0
125
126 Begin iteration:
127
128 iter = 6
          cord\_individul\_obj[indivial\_i, :] = [0.5.54.59.]
129
          cord_individul_obj[indivial_i, :] = [1. 3.110.113.]
130
131
          cord_individul_obj[indivial_i, :] = [2. 4. 94. 98.]
132
          cord_individul_obj[indivial_i, :] = [3. 5. 130. 135.]
          cord_individul_obj[indivial_i, :] = [4. 5. 62. 67.]
133
134
          cord_individul_obj[indivial_i, :] = [5. 5. 12. 17.]
135
          cord_individul_obj[indivial_i, :] = [6. 4. 18. 22.]
          cord individul obj[indivial i, :] = [7. 3. 24. 27.]
136
137
          cord_individul_obj[indivial_i, :] = [ 8. 4. 12. 16.]
138
          cord_individul_obj[indivial_i, :] = [9. 4. 34. 38.]
139
140
        min(cord\_individul\_obj[:, 3]) = 16.0
141
        historl\_G\_best\_iter[iter, 3] = 16.0
142 Begin iteration:
143
144 \text{ iter} = 7
145
          cord_individul_obj[indivial_i, :] = [0.5.12.17.]
146
          cord_individul_obj[indivial_i, :] = [ 1. 4. 12. 16.]
          cord_individul_obj[indivial_i, :] = [2. 3. 32. 35.]
147
148
          cord_individul_obj[indivial_i, :] = [3. 4. 12. 16.]
149
          cord_individul_obj[indivial_i, :] = [4. 5. 12. 17.]
150
          cord_individul_obj[indivial_i, :] = [5. 5. 8. 13.]
151
          cord_individul_obj[indivial_i, :] = [6. 4. 24. 28.]
152
          cord_individul_obj[indivial_i, :] = [ 7. 4. 48. 52.]
          cord individul obj[indivial i, :] = [8. 3. 24. 27.]
153
154
          cord_individul_obj[indivial_i, :] = [ 9. 4. 12. 16.]
155
156
        min(cord\_individul\_obj[:, 3]) = 13.0
157
       historl_G_best_iter[iter, 3] = 13.0
158 Begin iteration:
159
160 \text{ iter} = 8
          cord_individul_obj[indivial_i, :] = [ 0. 5. 44. 49.]
161
162
          cord_individul_obj[indivial_i, :] = [1. 5. 24. 29.]
           cord_individul_obj[indivial_i, :] = [2. 5. 52. 57.]
163
```

```
164
          cord_individul_obj[indivial_i, :] = [3. 4. 24. 28.]
165
          cord individul obj[indivial i, :] = [4. 4. 38. 42.]
          cord individul obj[indivial_i, :] = [5. 4. 24. 28.]
166
167
          cord_individul_obj[indivial_i, :] = [6. 5. 24. 29.]
168
          cord_individul_obj[indivial_i, :] = [7. 5. 8. 13.]
169
          cord_individul_obj[indivial_i, :] = [8. 5. 24. 29.]
170
          cord_individul_obj[indivial_i, :] = [ 9. 5. 32. 37.]
171
172
        min(cord\ individul\ obj[:, 3]) = 13.0
        historl_G_best_iter[iter, 3] = 13.0
173
174
     Begin iteration:
175
176
    iter = 9
177
          cord\_individul\_obj[indivial\_i, :] = [0. 4. 24. 28.]
178
          cord_individul_obj[indivial_i, :] = [ 1. 5. 38. 43.]
179
          cord_individul_obj[indivial_i, :] = [2. 5. 8. 13.]
          cord_individul_obj[indivial_i, :] = [ 3. 3. 44. 47.]
180
          cord individul_obj[indivial_i, :] = [4. 4. 28. 32.]
181
182
          cord_individul_obj[indivial_i, :] = [5. 4.38.42.]
183
          cord individul obj[indivial i, :] = [6.5.24.29.]
184
          cord_individul_obj[indivial_i, :] = [7. 3. 48. 51.]
          cord\_individul\_obj[indivial\_i, :] = [8. 5. 24. 29.]
185
186
          cord_individul_obj[indivial_i, :] = [9. 5. 28. 33.]
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. 3. 44. 47.]
194
          cord individul obj[indivial i, :] = [1.5.44.49.]
195
          cord individul obj[indivial i, :] = [2.5, 24, 29.]
196
          cord_individul_obj[indivial_i, :] = [3. 3. 52. 55.]
197
          cord_individul_obj[indivial_i, :] = [4. 4. 32. 36.]
          cord individul obj[indivial i, :] = [5.5.24.29.]
198
199
          cord_individul_obj[indivial_i, :] = [ 6. 5. 24. 29.]
200
          cord_individul_obj[indivial_i, :] = [7. 5. 8. 13.]
          cord individul obj[indivial i, :] = [8.5, 24, 29.]
201
202
          cord_individul_obj[indivial_i, :] = [9. 5. 72. 77.]
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 = 92.0
213
        Proportion of area = 0.08518518518518518
214
215
          BEST CHROM =
216
             berth: [ 2.5 26. 11. 16.5 6.5 21. ]
217
             time: [0. 0. 0. 0. 0. 0.]
218
            num_QC: [3. 2. 5. 2. 2. 2.]
219
        Objective function values and some other indicators:
                                Obj1 = 8.00
          Obj0 = 5.00
                                                       Obj0 + Obj1 = 13.00
220
221
          Total movement of crane: 8.00
222
          Total waiting time in berth position: 0.00
          Total index of q during berthing: 586.00
223
224
        Specific arrangement for each vessel:
           V_id: 0
225
                              li: 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
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: 11.0
                                                                         bow of i: 8.0
                                                                                                    tail of i: 14.0
                                                                                                                                gama i0: 0.0
           V_id: 2
                                                                                                                                                            gama_i1: 2
      0.
                       gama i1 + 1: 3.0
                                                     gama_i1 - gama_i0: 2.0
                                                                                          duration_time_i: 3.0
                                                                                                                              demand_i: 260.0
                                                                                                                                                            work
     load_i: 260.0
                                 work load gap_i: 0
228
          V_id: 3
                              li: 5.0
                                                  xi: 16.5
                                                                         bow of i: 14.0
                                                                                                    tail of i: 19.0
                                                                                                                                gama_i0: 0.0
                                                                                                                                                            gama_i1: 1
                       gama_i1 + 1: 2.0
                                                     gama_i1 - gama_i0: 1.0
                                                                                          duration_time_i: 2.0
                                                                                                                             demand_i: 80.0
                                                                                                                                                           work
     load i: 80.0
                              work load gap_i: 0
229
                                                  xi: 6.5
           V id: 4
                              li: 3.0
                                                                      bow of i: 5.0
                                                                                                  tail of i: 8.0
                                                                                                                           gama i0: 0.0
                                                                                                                                                       gama i1: 4.0
                    gama_i1 + 1: 5.0
                                                  gama_i1 - gama_i0: 4.0
                                                                                        duration_time_i: 5.0
                                                                                                                           demand_i: 200.0
                                                                                                                                                         work load i:
     200.0
                         work load gap i: 0
230
          V_id: 5
                              li: 4.0
                                                  xi: 21.0
                                                                         bow of i: 19.0
                                                                                                    tail of i: 23.0
                                                                                                                                gama_i0: 0.0
                                                                                                                                                           gama_i1: 5
                       gama_i1 + 1: 6.0
                                                                                          duration_time_i: 6.0
     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: 51 s
233 End
234
```