```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=9959
 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 = 29
23
       maxIter_num = 10
24
       W inertia = 1.0
25
       oder_type_num = 10
26
       c1 = 2.0
       c2 = 1.0
27
28
       r1 = 0.9650508570727729
29
       r2 = 0.9650508570727729
30 Begin iteration:
31
32
   iter = 0
33
       cord individul obj[indivial i, :] = \begin{bmatrix} 0. & 3.116.119. \end{bmatrix}
       cord_individul_obj[indivial_i, :] = [1. 5. 32. 37.]
34
       cord\_individul\_obj[indivial\_i,:] = [\ 2.\ 6.\ 124.\ 130.]
35
36
       cord_individul_obj[indivial_i, :] = [3. 4. 38. 42.]
       cord individul_obj[indivial_i, :] = [4. 4. 8. 12.]
37
       cord_individul_obj[indivial_i, :] = [5. 3. 60. 63.]
38
39
       cord_individul_obj[indivial_i, :] = [ 6. 5. 50. 55.]
40
       cord_individul_obj[indivial_i, :] = [7. 6. 54. 60.]
       cord individul_obj[indivial_i, :] = \begin{bmatrix} 8. & 4. & 62. & 66. \end{bmatrix}
41
       cord_individul_obj[indivial_i, :] = [ 9. 4. 74. 78.]
42
43
44
     min(cord\ individul\ obi[:, 3]) = 12.0
45
     historl\_G\_best\_iter[iter, 3] = 12.0
46
   Begin iteration:
47
48 iter = 1
49
       cord_individul_obj[indivial_i, :] = [0. 4. 58. 62.]
50
       cord_individul_obj[indivial_i, :] = [1. 6. 28. 34.]
       cord_individul_obj[indivial_i, :] = [2. 4. 8. 12.]
51
       cord individul obj[indivial i, :] = [3. 4.38.42.]
52
53
       cord_individul_obj[indivial_i, :] = [4. 5. 28. 33.]
54
       cord_individul_obj[indivial_i, :] = [5. 5. 32. 37.]
       cord individul_obj[indivial_i, :] = [6. 6. 20. 26.]
55
       cord_individul_obj[indivial_i, :] = [7. 5. 36. 41.]
56
       cord_individul_obj[indivial_i, :] = [ 8. 6. 52. 58.]
57
58
       cord individul obj[indivial i, :] = [9.5.44.49.]
59
     min(cord\_individul\_obj[:, 3]) = 12.0
60
     historl\_G\_best\_iter[iter, 3] = 12.0
62
   Begin iteration:
63
64
   iter = 2
       cord individul_obj[indivial_i, :] = [ 0. 4. 8. 12.]
65
       cord_individul_obj[indivial_i, :] = [1. 6. 26. 32.]
66
67
       cord_individul_obj[indivial_i, :] = [2, 5, 28, 33]
68
       cord_individul_obj[indivial_i, :] = [3. 6. 40. 46.]
       cord_individul_obj[indivial_i, :] = [4. 5. 24. 29.]
69
70
       cord_individul_obj[indivial_i, :] = [5. 5. 24. 29.]
71
       cord individul obj[indivial i, :] = [6.5.8.13.]
       cord_individul_obj[indivial_i, :] = [7. 4. 78. 82.]
73
       cord_individul_obj[indivial_i, :] = [ 8. 5. 44. 49.]
74
       cord_individul_obj[indivial_i, :] = [ 9. 6. 8. 14.]
75
76
     min(cord\ individul\ obj[:, 3]) = 12.0
     historl_G_best_iter[iter, 3] = 12.0
77
78 Begin iteration:
```

```
80 iter = 3
 81
          cord_individul_obj[indivial_i, :] = [ 0. 6. 44. 50.]
          cord_individul_obj[indivial_i, :] = [ 1. 4. 82. 86.]
 82
 83
          cord_individul_obj[indivial_i, :] = [2, 4, 8, 12.]
 84
          cord_individul_iobj[indivial_i, :] = [3. 4. 84. 88.]
 85
          cord_individul_obj[indivial_i, :] = [4. 4. 36. 40.]
          cord_individul_obj[indivial_i, :] = [5. 6. 38. 44.]
 86
 87
          cord_individul_obj[indivial_i, :] = [6. 4. 24. 28.]
 88
          cord_individul_obj[indivial_i, :] = [ 7. 4. 8. 12.]
          cord_individul_obj[indivial_i, :] = [ 8. 6. 80. 86.]
 89
 90
          cord_individul_obj[indivial_i, :] = [9. 6. 54. 60.]
 91
 92
        min(cord\ individul\ obj[:, 3]) = 12.0
 93
        historl\_G\_best\_iter[iter, 3] = 12.0
 94 Begin iteration:
 95
 96
     iter = 4
 97
          cord_individul_obj[indivial_i, :] = [0. 6. 12. 18.]
          cord_individul_obj[indivial_i, :] = [1. 6. 28. 34.]
 98
 99
          cord individul obj[indivial i, :] = [2.5.48.53.]
100
          cord_individul_obj[indivial_i, :] = [3. 4. 8. 12.]
101
          cord_individul_obj[indivial_i, :] = [4. 5. 48. 53.]
102
          cord_individul_obj[indivial_i, :] = [5. 6. 48. 54.]
          cord individul obj[indivial i, :] = [6.6.48.54.]
103
          cord_individul_obj[indivial_i, :] = [7. 5. 34. 39.]
104
105
          cord_individul_obj[indivial_i, :] = [8. 6. 12. 18.]
          cord_individul_obj[indivial_i, :] = [9. 6. 12. 18.]
106
107
108
        min(cord\_individul\_obj[:, 3]) = 12.0
109
       historl\_G\_best\_iter[iter, 3] = 12.0
110 Begin iteration:
111
112 \text{ iter} = 5
          cord_individul_obj[indivial_i, :] = [ 0. 6. 8. 14.]
113
          cord individul obj[indivial i, :] = [1. 6. 8. 14.]
114
          cord_individul_obj[indivial_i, :] = [2. 4. 18. 22.]
115
116
          cord_individul_obj[indivial_i, :] = [3. 6. 40. 46.]
          cord_individul_obj[indivial_i, :] = [4. 4. 18. 22.]
117
118
          cord_individul_obj[indivial_i, :] = [ 5. 4. 8. 12.]
119
          cord_individul_obj[indivial_i, :] = [ 6. 3.114.117.]
120
          cord_individul_obj[indivial_i, :] = [7. 4. 24. 28.]
121
          cord_individul_obj[indivial_i, :] = [ 8. 5. 18. 23.]
          cord_individul_obj[indivial_i, :] = [ 9. 5. 94. 99.]
122
123
        min(cord\_individul\_obj[:, 3]) = 12.0
124
       historl G_{best_{iter}[iter, 3]} = 12.0
125
126 Begin iteration:
127
128 iter = 6
          cord\_individul\_obj[indivial\_i, :] = [0. 4. 12. 16.]
129
          cord individul obj[indivial i, :] = [1. 4. 12. 16.]
130
131
          cord_individul_obj[indivial_i, :] = [2. 5. 12. 17.]
132
          cord_individul_obj[indivial_i, :] = [ 3. 4. 12. 16.]
          cord_individul_obj[indivial_i, :] = [4. 4. 12. 16.]
133
134
          cord_individul_obj[indivial_i, :] = [5. 6. 48. 54.]
135
          cord individul obj[indivial i, :] = [6.4.8.12.]
          cord individul obj[indivial i, :] = [7.5.56.61.]
136
137
          cord_individul_obj[indivial_i, :] = [ 8. 6. 12. 18.]
138
          cord_individul_obj[indivial_i, :] = [9. 4. 28. 32.]
139
140
        min(cord\_individul\_obj[:, 3]) = 12.0
141
        historl\_G\_best\_iter[iter, 3] = 12.0
142 Begin iteration:
143
144 \text{ iter} = 7
145
          cord_individul_obj[indivial_i, :] = [0. 6. 14. 20.]
146
          cord_individul_obj[indivial_i, :] = [1. 6. 12. 18.]
          cord_individul_obj[indivial_i, :] = [2. 5. 24. 29.]
147
148
          cord_individul_obj[indivial_i, :] = [3. 6. 12. 18.]
149
          cord_individul_obj[indivial_i, :] = [4. 5. 34. 39.]
150
          cord_individul_obj[indivial_i, :] = [5. 6. 12. 18.]
151
          cord_individul_obj[indivial_i, :] = [6. 6. 48. 54.]
152
          cord_individul_obj[indivial_i, :] = [7. 4. 8. 12.]
          cord individul obj[indivial i, :] = [8.5, 12, 17.]
153
154
          cord_individul_obj[indivial_i, :] = [ 9. 6. 8. 14.]
155
156
        min(cord\_individul\_obj[:, 3]) = 12.0
157
       historl\_G\_best\_iter[iter, 3] = 12.0
158 Begin iteration:
159
160 \text{ iter} = 8
          cord_individul_obj[indivial_i, :] = [ 0. 6. 24. 30.]
161
162
          cord_individul_obj[indivial_i, :] = [1. 3. 74. 77.]
          cord_individul_obj[indivial_i, :] = [2. 5. 18. 23.]
163
```

```
164
          cord_individul_obj[indivial_i, :] = [3. 6. 8. 14.]
165
          cord individul obj[indivial i, :] = [4. 4. 36. 40.]
          cord individul obj[indivial_i, :] = [5. 5. 18. 23.]
166
167
          cord_individul_obj[indivial_i, :] = [6. 4. 8. 12.]
168
          cord_individul_obj[indivial_i, :] = [7. 5. 40. 45.]
169
          cord individul obj[indivial i, :] = [8.6.12.18.]
170
          cord_individul_obj[indivial_i, :] = [ 9. 6. 30. 36.]
171
172
        min(cord\ individul\ obj[:, 3]) = 12.0
        historl_G_best_iter[iter, 3] = 12.0
173
174
     Begin iteration:
175
176 iter = 9
          cord\_individul\_obj[indivial\_i, :] = [0. 4.48.52.]
177
178
          cord_individul_obj[indivial_i, :] = [ 1. 4. 8. 12.]
179
          cord_individul_obj[indivial_i, :] = [2. 5. 12. 17.]
          cord_individul_obj[indivial_i, :] = [3. 4. 58. 62.]
180
          cord individul_obj[indivial_i, :] = [4. 5. 18. 23.]
181
182
          cord_individul_obj[indivial_i, :] = [5. 6. 48. 54.]
183
          cord_individul_obj[indivial_i, :] = [6. 6. 18. 24.]
184
          cord_individul_obj[indivial_i, :] = [7. 5. 30. 35.]
          cord\_individul\_obj[indivial\_i, :] = [8. 5. 20. 25.]
185
186
          cord_individul_obj[indivial_i, :] = [9. 6. 12. 18.]
187
188
        min(cord\_individul\_obj[:, 3]) = 12.0
189
        historl_G_best_iter[iter, 3] = 12.0
190 Begin iteration:
191
     iter = 10
192
193
          cord_individul_obj[indivial_i, :] = [0. 4. 30. 34.]
194
          cord individul obj[indivial i, :] = [1. 6. 12. 18.]
195
          cord individul obj[indivial i, :] = [2.5.36.41.]
196
          cord_individul_obj[indivial_i, :] = [3. 4. 8. 12.]
197
          cord_individul_obj[indivial_i, :] = [4. 5. 18. 23.]
          cord individul obj[indivial i, :] = [5. 6. 8. 14.]
198
199
          cord_individul_obj[indivial_i, :] = [6. 5. 58. 63.]
200
          cord_individul_obj[indivial_i, :] = [7. 5. 68. 73.]
          cord individul obj[indivial i, :] = [8.5, 28, 33.]
201
202
          cord_individul_obj[indivial_i, :] = [9, 5, 30, 35]
203
204
        min(cord\_individul\_obj[:, 3]) = 12.0
205
        historl G best iter[iter, 3] = 12.0
206
     Iteration calculate over
207
208
209
210
211
     All item are in Bin and:
212
        Bin area = 1080
213
        Real area = 89.0
214
        Proportion of area = 0.0824074074074074
          BEST\_CHROM =
215
216
             berth: [5.5 26. 20. 10.5 1.5 15.]
217
             time: [0. 0. 0. 0. 0. 0.]
218
            num_QC: [2. 2. 3. 2. 3. 3.]
219
        Objective function values and some other indicators:
                                Obj1 = 8.00
          Obj0 = 4.00
                                                       Obj0 + Obj1 = 12.00
220
221
          Total movement of crane: 8.00
222
          Total waiting time in berth position: 0.00
          Total index of q during berthing: 572.00
223
224
        Specific arrangement for each vessel:
           V_id: 0
225
                              li: 5.0
                                                  xi: 5.5
                                                                      bow of i: 3.0
                                                                                                  tail of i: 8.0
                                                                                                                           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: 20.0
                                                                         bow of i: 17.0
                                                                                                    tail of i: 23.0
                                                                                                                                gama i0: 0.0
           V_id: 2
                                                                                                                                                            gama_i1: 4
      0.
                       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
                              li: 5.0
                                                  xi: 10.5
                                                                         bow of i: 8.0
                                                                                                    tail of i: 13.0
                                                                                                                                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: 80.0
                              work load gap_i: 0
229
                                                  xi: 1.5
           V id: 4
                              li: 3.0
                                                                      bow of i: 0.0
                                                                                                  tail of i: 3.0
                                                                                                                           gama i0: 0.0
                                                                                                                                                      gama i1: 3.0
                    gama_i1 + 1: 4.0
                                                  gama_i1 - gama_i0: 3.0
                                                                                        duration_time_i: 4.0
                                                                                                                           demand_i: 200.0
                                                                                                                                                         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: 3
                       gama_i1 + 1: 4.0
                                                                                          duration_time_i: 4.0
     0
                                                     gama_i1 - gama_i0: 3.0
                                                                                                                             demand_i: 220.0
                                                                                                                                                           work
     load i: 220.0
                                 work load gap i: 0
231
232
     Algorithm finished and the total CPU time: 41 s
233 End
234
```