```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=11620
 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 = 22
23
       maxIter_num = 10
24
       W inertia = 2.0
25
       oder_type_num = 10
26
       c1 = 1.0
       c2 = 2.0
27
28
       r1 = 0.7542352604045242
29
       r2 = 0.7542352604045242
30 Begin iteration:
31
32
   iter = 0
33
       cord individul obj[indivial i, :] = [0.6.58.64.]
       cord_individul_obj[indivial_i, :] = [1. 4. 68. 72.]
34
       cord_individul_obj[indivial_i, :] = [ 2. 5. 58. 63.]
35
36
       cord_individul_obj[indivial_i, :] = [3. 4. 28. 32.]
       cord individul_obj[indivial_i, :] = [4. 6. 62. 68.]
37
       cord_individul_obj[indivial_i, :] = [5. 6. 72. 78.]
38
39
       cord_individul_obj[indivial_i, :] = [6. 6. 78. 84.]
40
       cord_individul_iobj[indivial_i, :] = [7. 3. 42. 45.]
       cord_individul_obj[indivial_i, :] = [ 8. 3. 136. 139.]
41
       cord_individul_obj[indivial_i, :] = [ 9. 5. 16. 21.]
42
43
44
     min(cord\ individul\ obi[:, 3]) = 21.0
45
     historl\_G\_best\_iter[iter, 3] = 21.0
46
   Begin iteration:
47
48 iter = 1
49
       cord_individul_obj[indivial_i, :] = [0. 4. 24. 28.]
50
       cord_individul_obj[indivial_i, :] = [1. 4. 24. 28.]
       cord_individul_obj[indivial_i, :] = [2. 4. 28. 32.]
51
       cord individul obj[indivial i, :] = [3. 5. 54. 59.]
52
53
       cord_individul_obj[indivial_i, :] = [ 4. 3. 146. 149.]
54
       cord_individul_obj[indivial_i, :] = [ 5. 4. 132. 136.]
       cord_individul_obj[indivial_i, :] = [6. 3. 30. 33.]
55
       cord_individul_obj[indivial_i, :] = [7. 4. 36. 40.]
56
       cord_individul_obj[indivial_i, :] = [8. 5. 16. 21.]
57
58
       cord individul obj[indivial i, :] = [9. 3. 92. 95.]
59
60
     min(cord\_individul\_obj[:, 3]) = 21.0
     historl\_G\_best\_iter[iter, 3] = 21.0
62
   Begin iteration:
63
64
   iter = 2
       cord\ individul\_obj[indivial\_i,:] = [0.4,42,46.]
65
       cord_individul_iobj[indivial_i, :] = [1. 4. 50. 54.]
66
       cord_individul_obj[indivial_i, :] = [2. 5. 34. 39.]
cord_individul_obj[indivial_i, :] = [3. 3. 120. 123.]
67
68
       cord_individul_obj[indivial_i, :] = [4. 5. 16. 21.]
69
70
       cord_individul_obj[indivial_i, :] = [5. 5. 26. 31.]
71
       cord individul obj[indivial i, :] = [6.5.8.13.]
       cord_individul_obj[indivial_i, :] = [7. 5. 8. 13.]
73
       cord_individul_obj[indivial_i, :] = [8. 5. 68. 73.]
74
       cord_individul_obj[indivial_i, :] = [ 9. 4. 12. 16.]
75
76
     min(cord\ individul\ obj[:, 3]) = 13.0
     historl_G_best_iter[iter, 3] = 13.0
77
78 Begin iteration:
```

```
80 \text{ iter} = 3
 81
          cord_individul_obj[indivial_i, :] = [ 0. 4. 46. 50.]
          cord_individul_obj[indivial_i, :] = [1. 6. 16. 22.]
 82
 83
          cord_individul_obj[indivial_i, :] = [2, 4, 12, 16]
 84
          cord individul obj[indivial i, :] = [3. 5. 8. 13.]
 85
          cord_individul_obj[indivial_i, :] = [4. 6. 66. 72.]
          cord_individul_obj[indivial_i, :] = [5. 6. 68. 74.]
 86
 87
          cord_individul_obj[indivial_i, :] = [6. 5. 66. 71.]
 88
          cord_individul_obj[indivial_i, :] = [7. 4. 28. 32.]
          cord_individul_obj[indivial_i, :] = [ 8. 6. 32. 38.]
 89
 90
          cord_individul_obj[indivial_i, :] = [9. 6. 24. 30.]
 91
 92
        min(cord\ individul\ obj[:, 3]) = 13.0
 93
        historl\_G\_best\_iter[iter, 3] = 13.0
 94 Begin iteration:
 95
 96
     iter = 4
 97
          cord_individul_obj[indivial_i, :] = [0. 4.78.82.]
          cord_individul_obj[indivial_i, :] = [ 1. 4. 90. 94.]
 98
 99
          cord_individul_obj[indivial_i, :] = [ 2. 6. 18. 24.]
100
          cord_individul_obj[indivial_i, :] = [3. 3. 54. 57.]
101
          cord_individul_obj[indivial_i, :] = [4, 3, 52, 55]
102
          cord_individul_obj[indivial_i, :] = [5. 5. 8. 13.]
103
          cord individul obj[indivial i, :] = [6.5.44.49.]
          cord_individul_obj[indivial_i, :] = [7. 4. 24. 28.]
104
105
          cord_individul_obj[indivial_i, :] = [8. 3. 28. 31.]
          cord_individul_obj[indivial_i, :] = [ 9. 5. 100. 105.]
106
107
108
        min(cord\_individul\_obj[:, 3]) = 13.0
109
       historl_G_best_iter[iter, 3] = 13.0
110 Begin iteration:
111
112 \text{ iter} = 5
          cord_individul_obj[indivial_i, :] = [0. 4. 44. 48.]
113
          cord individul obj[indivial i, :] = [1. 4. 18. 22.]
114
          cord_individul_obj[indivial_i, :] = [2. 6. 12. 18.]
115
116
          cord_individul_obj[indivial_i, :] = [3. 3. 60. 63.]
          cord_individul_obj[indivial_i, :] = [4. 4. 38. 42.]
117
118
          cord_individul_obj[indivial_i, :] = [5. 6. 54. 60.]
119
          cord_individul_obj[indivial_i, :] = [6. 5. 58. 63.]
120
          cord_individul_obj[indivial_i, :] = [7. 4. 36. 40.]
121
          cord_individul_obj[indivial_i, :] = [ 8. 3. 104. 107.]
          cord_individul_obj[indivial_i, :] = [ 9. 5. 8. 13.]
122
123
        min(cord\_individul\_obj[:, 3]) = 13.0
124
       historl G_{best_iter[iter, 3]} = 13.0
125
126 Begin iteration:
127
128 iter = 6
129
          cord\_individul\_obj[indivial\_i,:] = [\ 0.\ \ 4.\ 48.\ 52.]
          cord_individul_obj[indivial_i, :] = [ 1. 4. 48. 52.]
130
131
          cord_individul_obj[indivial_i, :] = [2. 5. 12. 17.]
132
          cord\_individul\_obj[indivial\_i, :] = [3. 4. 48. 52.]
          cord_individul_obj[indivial_i, :] = [4. 6. 12. 18.]
133
134
          cord_individul_obj[indivial_i, :] = [5. 6. 18. 24.]
135
          cord_individul_obj[indivial_i, :] = [6. 6. 18. 24.]
          cord individul obj[indivial i, :] = [7. 4. 12. 16.]
136
137
          cord_individul_obj[indivial_i, :] = [ 8. 5. 8. 13.]
138
          cord_individul_obj[indivial_i, :] = [9. 6. 28. 34.]
139
140
        min(cord\_individul\_obj[:, 3]) = 13.0
141
        historl\_G\_best\_iter[iter, 3] = 13.0
142 Begin iteration:
143
144 \text{ iter} = 7
145
          cord_individul_obj[indivial_i, :] = [0. 5. 8. 13.]
146
          cord_individul_obj[indivial_i, :] = [ 1. 4. 98. 102.]
          cord_individul_obj[indivial_i, :] = [ 2. 6. 12. 18.]
147
148
          cord_individul_obj[indivial_i, :] = [3. 6. 12. 18.]
149
          cord_individul_obj[indivial_i, :] = [4. 6. 48. 54.]
150
          cord_individul_obj[indivial_i, :] = [5. 6. 48. 54.]
151
          cord_individul_obj[indivial_i, :] = [6. 5. 46. 51.]
152
          cord_individul_obj[indivial_i, :] = [7. 4. 28. 32.]
          cord individul obj[indivial i, :] = [8. 3. 66. 69.]
153
154
          cord_individul_obj[indivial_i, :] = [ 9. 6. 12. 18.]
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. 4. 36. 40.]
161
162
          cord_individul_obj[indivial_i, :] = [ 1. 5. 8. 13.]
          cord_individul_obj[indivial_i, :] = [2. 4. 12. 16.]
163
```

```
164
          cord_individul_obj[indivial_i, :] = [3. 6. 18. 24.]
165
          cord individul obj[indivial i, :] = [4.6.42.48.]
          cord individul obj[indivial_i, :] = [5. 6. 28. 34.]
166
167
          cord_individul_obj[indivial_i, :] = [6.5.36.41.]
168
          cord individul obj[indivial i, :] = [7. 4. 18. 22.]
169
          cord individul obj[indivial i, :] = [8.5, 52, 57.]
170
          cord_individul_obj[indivial_i, :] = [ 9. 6. 36. 42.]
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
          cord\_individul\_obj[indivial\_i, :] = [0. 4. 8. 12.]
177
178
          cord\_individul\_obj[indivial\_i, :] = [1. 5.118.123.]
179
          cord_individul_obj[indivial_i, :] = [2. 6. 12. 18.]
180
          cord_individul_obj[indivial_i, :] = [ 3. 4.118.122.]
          cord individul_obj[indivial_i, :] = [4. 6.52.58.]
181
182
          cord_individul_obj[indivial_i, :] = [5. 3. 52. 55.]
183
          cord individul obj[indivial i, :] = [6.5.44.49.]
184
          cord_individul_obj[indivial_i, :] = [7. 5. 38. 43.]
          cord_individul_obj[indivial_i, :] = [8. 5. 8. 13.]
185
186
          cord_individul_obj[indivial_i, :] = [9. 5. 16. 21.]
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, :] = [0.5.68.73.]
194
          cord individul obj[indivial i, :] = [1. 4. 8. 12.]
195
          cord individul obj[indivial i, :] = [2. 6. 12. 18.]
196
          cord_individul_obj[indivial_i, :] = [3, 5, 20, 25]
197
          cord_individul_obj[indivial_i, :] = [4. 5. 32. 37.]
          cord individul obj[indivial i, :] = [5.6.40.46.]
198
199
          cord_individul_obj[indivial_i, :] = [6. 4. 8. 12.]
200
          cord_individul_obj[indivial_i, :] = [7. 4. 8. 12.]
          cord individul obj[indivial i, :] = [8. 3. 62. 65.]
201
202
          cord_individul_obj[indivial_i, :] = [ 9. 6. 18. 24.]
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 = 110.0
        Proportion of area = 0.10185185185185185
214
215
          BEST_CHROM =
216
             berth: [20.5 26. 3. 12.5 16.5 8.]
217
             time: [0. 0. 0. 0. 0. 0.]
218
            num_QC: [2. 2. 3. 3. 2. 4.]
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
223
          Total index of q during berthing: 494.00
224
        Specific arrangement for each vessel:
           V_id: 0
225
                              li: 5.0
                                                  xi: 20.5
                                                                        bow of i: 18.0
                                                                                                    tail of i: 23.0
                                                                                                                               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
226
                                                  xi: 26.0
          V_id: 1
                              li: 6.0
                                                                        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
                                                                      bow of i: 0.0
                                                                                                 tail of i: 6.0
                                                                                                                           gama i0: 0.0
                                                                                                                                                      gama i1: 4.0
           V_id: 2
                                                  xi: 3.0
                    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
                                                  xi: 12.5
          V_id: 3
                                                                        bow of i: 10.0
                                                                                                    tail of i: 15.0
                                                                                                                               gama i0: 0.0
                              li: 5.0
                                                                                                                                                           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
                                                  xi: 16.5
229
           V_id: 4
                              li: 3.0
                                                                        bow of i: 15.0
                                                                                                    tail of i: 18.0
                                                                                                                               gama i0: 0.0
                                                                                                                                                           gama i1:4
                                                    gama_i1 - gama_i0: 4.0
                       gama_i1 + 1: 5.0
                                                                                          duration_time_i: 5.0
     0
                                                                                                                             demand_i: 200.0
                                                                                                                                                           work
     load_i: 200.0
                                 work load gap i: 0
230
           V_id: 5
                              li: 4.0
                                                  xi: 8.0
                                                                      bow of i: 6.0
                                                                                                 tail of i: 10.0
                                                                                                                             gama_i0: 0.0
                                                                                                                                                        gama_i1: 2.0
                    gama_i1 + 1: 3.0
                                                  gama_i1 - gama_i0: 2.0
                                                                                        duration_time_i: 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: 38 s
233
    End
234
```