```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=54326
 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'])
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 = 18
23
       maxIter num = 10
24
       W inertia = 1.0
25
       oder_type_num = 10
26
       c1 = 1.0
       c2 = 2.5
27
28
       r1 = 0.9816110693752778
29
       r2 = 0.9816110693752778
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. 80. 83.]
38
39
       cord_individul_obj[indivial_i, :] = [ 6. 3.110.113.]
40
       cord_individul_obj[indivial_i, :] = [ 7. 3. 134. 137.]
       cord_individul_obj[indivial_i, :] = [ 8. 3. 164. 167.]
41
       cord_individul_obj[indivial_i, :] = [ 9. 3.116.119.]
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. 3. 92. 95.]
50
       cord_individul_obj[indivial_i, :] = [1. 3. 72. 75.]
       cord_individul_obj[indivial_i, :] = [2. 4. 84. 88.]
51
       cord individul obj[indivial i, :] = \begin{bmatrix} 3 & 3.106.109. \end{bmatrix}
52
53
       cord_individul_obj[indivial_i, :] = [4. 4. 74. 78.]
54
       cord_individul_obj[indivial_i, :] = [5. 4. 84. 88.]
       cord_individul_obj[indivial_i, :] = [ 6. 4. 106. 110.]
55
       cord_individul_obj[indivial_i, :] = [7. 3. 36. 39.]
56
       cord_individul_obj[indivial_i, :] = [8. 3. 92. 95.]
57
58
       cord individul obj[indivial i, :] = [9. 4. 66. 70.]
59
     min(cord\_individul\_obj[:, 3]) = 39.0
60
     historl\_G\_best\_iter[iter, 3] = 39.0
62
   Begin iteration:
63
64
   iter = 2
       cord_individul_obj[indivial_i, :] = [ 0. 3. 26. 29.] cord_individul_obj[indivial_i, :] = [ 1. 5. 38. 43.]
65
66
67
       cord_individul_obj[indivial_i, :] = [2, 5, 26, 31]
68
       cord_individul_obj[indivial_i, :] = [3. 5. 48. 53.]
       cord_individul_obj[indivial_i, :] = [4. 5. 40. 45.]
69
70
       cord_individul_obj[indivial_i, :] = [5. 5. 48. 53.]
71
       cord_individul_obj[indivial_i, :] = [6. 3. 36. 39.]
       cord_individul_obj[indivial_i, :] = [7. 5. 48. 53.]
73
       cord_individul_obj[indivial_i, :] = [8. 3. 54. 57.]
74
       cord_individul_obj[indivial_i, :] = [9. 5. 48. 53.]
75
76
     min(cord\ individul\ obj[:, 3]) = 29.0
     historl_G_best_iter[iter, 3] = 29.0
77
78 Begin iteration:
```

```
80 iter = 3
 81
          cord_individul_obj[indivial_i, :] = [0. 3. 40. 43.]
          cord_individul_obj[indivial_i, :] = [ 1. 4. 20. 24.]
 82
 83
          cord_individul_obj[indivial_i, :] = [2, 4, 66, 70]
 84
          cord individul obj[indivial i, :] = [3. 3. 40. 43.]
 85
          cord_individul_obj[indivial_i, :] = [4. 4. 30. 34.]
          cord_individul_obj[indivial_i, :] = [5. 4. 30. 34.]
 86
 87
          cord_individul_obj[indivial_i, :] = [6. 5. 34. 39.]
 88
          cord_individul_obj[indivial_i, :] = [7. 5. 34. 39.]
          cord_individul_obj[indivial_i, :] = [ 8. 3. 26. 29.]
 89
 90
          cord_individul_obj[indivial_i, :] = [9. 4. 30. 34.]
 91
 92
        min(cord\ individul\ obj[:, 3]) = 24.0
 93
        historl\_G\_best\_iter[iter, 3] = 24.0
 94 Begin iteration:
 95
 96
     iter = 4
 97
          cord_individul_obj[indivial_i, :] = [ 0. 4. 8. 12.]
          cord_individul_obj[indivial_i, :] = [ 1. 4.114.118.]
 98
 99
          cord_individul_obj[indivial_i, :] = [ 2. 4. 20. 24.]
100
          cord_individul_obj[indivial_i, :] = [3. 3. 8. 11.]
101
          cord_individul_obj[indivial_i, :] = [4, 4, 42, 46]
102
          cord_individul_obj[indivial_i, :] = [5. 6. 30. 36.]
          cord individul obj[indivial i, :] = [6. 4.30.34.]
103
          cord_individul_obj[indivial_i, :] = [7. 5. 26. 31.]
104
105
          cord_individul_obj[indivial_i, :] = [ 8. 4. 46. 50.]
          cord_individul_obj[indivial_i, :] = [ 9. 6. 8. 14.]
106
107
108
        min(cord\_individul\_obj[:, 3]) = 11.0
109
       historl\_G\_best\_iter[iter, 3] = 11.0
110 Begin iteration:
111
112 \text{ iter} = 5
          cord_individul_obj[indivial_i, :] = [0. 3. 20. 23.]
113
          cord_individul_obj[indivial_i, :] = [1. 3. 8. 11.]
114
          cord_individul_obj[indivial_i, :] = [2. 5. 12. 17.]
115
116
          cord_individul_obj[indivial_i, :] = [3. 5. 20. 25.]
          cord_individul_obj[indivial_i, :] = [4. 4. 12. 16.]
117
118
          cord_individul_obj[indivial_i, :] = [5. 4. 12. 16.]
119
          cord_individul_obj[indivial_i, :] = [6. 5. 12. 17.]
120
          cord_individul_obj[indivial_i, :] = [ 7. 5. 54. 59.]
          cord_individul_obj[indivial_i, :] = [ 8. 3. 20. 23.]
121
          cord_individul_obj[indivial_i, :] = [ 9. 5. 12. 17.]
122
123
124
        min(cord\_individul\_obj[:, 3]) = 11.0
       historl G_{best_iter[iter, 3]} = 11.0
125
126 Begin iteration:
127
128 iter = 6
          cord\_individul\_obj[indivial\_i, :] = [0. 3.38.41.]
129
          cord_individul_obj[indivial_i, :] = [ 1. 4. 20. 24.]
130
131
          cord_individul_obj[indivial_i, :] = [2. 6. 8. 14.]
132
          cord_individul_obj[indivial_i, :] = [3, 3, 32, 35]
          cord_individul_obj[indivial_i, :] = [4. 6. 14. 20.]
133
134
          cord_individul_obj[indivial_i, :] = [5. 6. 12. 18.]
135
          cord_individul_obj[indivial_i, :] = [6. 6. 8. 14.]
          cord individul obj[indivial i, :] = [7. 3. 8. 11.]
136
137
          cord_individul_obj[indivial_i, :] = [8. 3. 60. 63.]
138
          cord_individul_obj[indivial_i, :] = [9. 6. 18. 24.]
139
140
        min(cord\_individul\_obj[:, 3]) = 11.0
141
        historl\_G\_best\_iter[iter, 3] = 11.0
142 Begin iteration:
143
144 \text{ iter} = 7
145
          cord_individul_obj[indivial_i, :] = [0. 3. 20. 23.]
146
          cord_individul_obj[indivial_i, :] = [1. 4. 40. 44.]
          cord_individul_obj[indivial_i, :] = [2. 5. 38. 43.]
147
148
          cord_individul_obj[indivial_i, :] = [ 3. 5. 12. 17.]
149
          cord_individul_obj[indivial_i, :] = [4. 3. 28. 31.]
150
          cord_individul_obj[indivial_i, :] = [5. 4. 12. 16.]
151
          cord_individul_obj[indivial_i, :] = [6. 3. 20. 23.]
152
          cord_individul_obj[indivial_i, :] = [7. 5. 26. 31.]
          cord individul obj[indivial i, :] = [8. 3. 8. 11.]
153
154
          cord_individul_obj[indivial_i, :] = [ 9. 5. 20. 25.]
155
156
        min(cord\_individul\_obj[:, 3]) = 11.0
157
       historl_G_best_iter[iter, 3] = 11.0
158 Begin iteration:
159
160 \text{ iter} = 8
          cord_individul_obj[indivial_i, :] = [0. 3. 36. 39.]
161
162
          cord_individul_obj[indivial_i, :] = [ 1. 3. 8. 11.]
          cord_individul_obj[indivial_i, :] = [2. 5. 48. 53.]
163
```

```
164
          cord_individul_obj[indivial_i, :] = [3. 5. 20. 25.]
165
          cord individul obj[indivial i, :] = [4. 4. 12. 16.]
          cord individul obj[indivial_i, :] = [5. 4. 24. 28.]
166
167
          cord_individul_obj[indivial_i, :] = [6.5.12.17.]
168
          cord individul obj[indivial i, :] = [7. 3.52.55.]
169
          cord individul obj[indivial i, :] = [8. 3. 20. 23.]
170
          cord_individul_obj[indivial_i, :] = [ 9. 5. 18. 23.]
171
172
        min(cord\ individul\ obj[:, 3]) = 11.0
        historl_G_best_iter[iter, 3] = 11.0
173
174
     Begin iteration:
175
176
    iter = 9
          cord\_individul\_obj[indivial\_i, :] = [0. 3. 12. 15.]
177
178
          cord\_individul\_obj[indivial\_i, :] = [1. 4. 40. 44.]
179
          cord_individul_obj[indivial_i, :] = [2. 4. 18. 22.]
          cord_individul_obj[indivial_i, :] = [ 3. 3. 20. 23.]
180
          cord individul_obj[indivial_i, :] = [4. 3. 20. 23.]
181
182
          cord_individul_obj[indivial_i, :] = [5. 3. 20. 23.]
183
          cord individul obj[indivial i, :] = [6. 3. 12. 15.]
184
          cord_individul_obj[indivial_i, :] = [7. 3. 8. 11.]
          cord\_individul\_obj[indivial\_i, :] = [8. 3. 12. 15.]
185
186
          cord_individul_obj[indivial_i, :] = [9. 3. 20. 23.]
187
188
        min(cord\_individul\_obj[:, 3]) = 11.0
189
        historl_G_best_iter[iter, 3] = 11.0
190 Begin iteration:
191
     iter = 10
192
193
          cord_individul_obj[indivial_i, :] = [0. 3. 38. 41.]
194
          cord individul obj[indivial i, :] = [1. 3. 8. 11.]
195
          cord individul obj[indivial i, :] = [2.5.36.41.]
196
          cord_individul_obj[indivial_i, :] = [3. 5. 12. 17.]
197
          cord_individul_obj[indivial_i, :] = [4. 4. 18. 22.]
          cord individul obj[indivial i, :] = [5. 4. 12. 16.]
198
199
          cord_individul_obj[indivial_i, :] = [ 6. 5. 12. 17.]
200
          cord_individul_obj[indivial_i, :] = [ 7. 5. 52. 57.]
          cord individul obj[indivial i, :] = [8. 3. 12. 15.]
201
202
          cord_individul_obj[indivial_i, :] = [ 9. 5. 12. 17.]
203
204
        min(cord\_individul\_obj[:, 3]) = 11.0
205
        historl G best_iter[iter, 3] = 11.0
206
     Iteration calculate over
207
208
209
210
211
     All item are in Bin and:
212
        Bin area = 1080
213
        Real area = 98.0
214
        Proportion of area = 0.09074074074074075
          BEST_CHROM =
215
216
             berth: [7.5 26. 20. 2.5 11.5 15.]
217
             time: [0. 0. 0. 0. 0. 0.]
218
            num_QC: [2. 2. 4. 2. 3. 3.]
219
        Objective function values and some other indicators:
                                 Obj1 = 8.00
          Obj0 = 3.00
                                                       Obj0 + Obj1 = 11.00
220
221
          Total movement of crane: 8.00
222
          Total waiting time in berth position: 0.00
223
          Total index of q during berthing: 654.00
224
        Specific arrangement for each vessel:
           V_id: 0
225
                              li: 5.0
                                                  xi: 7.5
                                                                       bow of i: 5.0
                                                                                                  tail of i: 10.0
                                                                                                                              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
                                                                                                                                                            gama_i1: 3
           V_id: 2
      0.
                       gama i1 + 1: 4.0
                                                     gama_i1 - gama_i0: 3.0
                                                                                           duration_time_i: 4.0
                                                                                                                              demand i: 260.0
                                                                                                                                                            work
     load_i: 260.0
                                 work load gap_i: 0
228
          V_id: 3
                              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
     80.0
                                                  xi: 11.5
229
           V id: 4
                              li: 3.0
                                                                         bow of i: 10.0
                                                                                                    tail of i: 13.0
                                                                                                                                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: 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
                                                     gama_i1 - gama_i0: 3.0
                                                                                           duration_time_i: 4.0
                                                                                                                              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
```