

```

1 "E:\1 \ \ \ \ \3 \ \ \ \ \ \1 \ \ \ \ \ \ \ \ \ \ \1 \ \ \ \ \ \ \ \ \ \ \ \1_LW_ \ \ \ \ \2\6 \ \ \ \ \2 python code\01_My_Python_Code\Scripts\python.
   exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=54410
2
3 import sys; print('Python %s on %s' % (sys.version, sys.platform))
4 sys.path.extend(['E:\1 \ \ \ \ \3 \ \ \ \ \ \1 \ \ \ \ \ \ \ \ \ \ \1 \ \ \ \ \ \ \ \ \ \ \ \1_LW_ \ \ \ \ \2\6 \ \ \ \ \2 python code\
   01_My_Python_Code', 'E:/1 \ \ \ \ \3 \ \ \ \ \ \1 \ \ \ \ \ \ \ \ \ \ \1 \ \ \ \ \ \ \ \ \ \ \ \1_LW_ \ \ \ \ \2\6 \ \ \ \ \2 python code/
   01_My_Python_Code'])
5
6 PyDev console: starting.
7
8 Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
9 >>> runfile('E:/1 \ \ \ \ \3 \ \ \ \ \ \1 \ \ \ \ \ \ \ \ \ \ \1 \ \ \ \ \ \ \ \ \ \ \ \1_LW_ \ \ \ \ \2\6 \ \ \ \ \2 python code/01_My_Python_Code/
   main_BACASP_offical_PSO_2D_Bin_berth_line.py', wdir='E:/1 \ \ \ \ \3 \ \ \ \ \ \1 \ \ \ \ \ \ \ \ \ \ \1 \ \ \ \ \ \ \ \ \ \ \ \1_LW_ \ \ \ \ \2\6
   \ \ \ \ \2 python code/01_My_Python_Code')
10 Backend TkAgg is interactive backend. Turning interactive mode on.
11 Waiting 1s.....
12
13 This is the R_6_1_standerd_test.xlsx optimization process.
14
15 Start
16   Read basic data
17     V = 6
18     T = 36
19     Q = 23
20     L = 30
21   PSO parameter setting:
22     Trail = 18
23     maxlter_num = 10
24     W_inertia = 1.0
25     oder_type_num = 10
26     c1 = 1.0
27     c2 = 2.5
28     r1 = 0.24918456280472912
29     r2 = 0.24918456280472912
30 Begin iteration:
31
32 iter = 0
33   cord_individul_obj[indivial_i, :] = [ 0.  3. 156. 159.]
34   cord_individul_obj[indivial_i, :] = [ 1.  3. 164. 167.]
35   cord_individul_obj[indivial_i, :] = [ 2.  3. 100. 103.]
36   cord_individul_obj[indivial_i, :] = [ 3.  3. 132. 135.]
37   cord_individul_obj[indivial_i, :] = [ 4.  3. 72. 75.]
38   cord_individul_obj[indivial_i, :] = [ 5.  3. 56. 59.]
39   cord_individul_obj[indivial_i, :] = [ 6.  3. 78. 81.]
40   cord_individul_obj[indivial_i, :] = [ 7.  3. 102. 105.]
41   cord_individul_obj[indivial_i, :] = [ 8.  3. 116. 119.]
42   cord_individul_obj[indivial_i, :] = [ 9.  3. 126. 129.]
43
44   min(cord_individul_obj[:, 3]) = 59.0
45   historl_G_best_iter[iter, 3] = 59.0
46 Begin iteration:
47
48 iter = 1
49   cord_individul_obj[indivial_i, :] = [ 0.  4. 30. 34.]
50   cord_individul_obj[indivial_i, :] = [ 1.  3. 56. 59.]
51   cord_individul_obj[indivial_i, :] = [ 2.  4. 30. 34.]
52   cord_individul_obj[indivial_i, :] = [ 3.  4. 52. 56.]
53   cord_individul_obj[indivial_i, :] = [ 4.  4. 72. 76.]
54   cord_individul_obj[indivial_i, :] = [ 5.  4. 72. 76.]
55   cord_individul_obj[indivial_i, :] = [ 6.  3. 90. 93.]
56   cord_individul_obj[indivial_i, :] = [ 7.  4. 30. 34.]
57   cord_individul_obj[indivial_i, :] = [ 8.  3. 30. 33.]
58   cord_individul_obj[indivial_i, :] = [ 9.  4. 58. 62.]
59
60   min(cord_individul_obj[:, 3]) = 33.0
61   historl_G_best_iter[iter, 3] = 33.0
62 Begin iteration:
63
64 iter = 2
65   cord_individul_obj[indivial_i, :] = [ 0.  3. 20. 23.]
66   cord_individul_obj[indivial_i, :] = [ 1.  4. 40. 44.]
67   cord_individul_obj[indivial_i, :] = [ 2.  3. 20. 23.]
68   cord_individul_obj[indivial_i, :] = [ 3.  3. 20. 23.]
69   cord_individul_obj[indivial_i, :] = [ 4.  3. 20. 23.]
70   cord_individul_obj[indivial_i, :] = [ 5.  3. 20. 23.]
71   cord_individul_obj[indivial_i, :] = [ 6.  3. 30. 33.]
72   cord_individul_obj[indivial_i, :] = [ 7.  3. 20. 23.]
73   cord_individul_obj[indivial_i, :] = [ 8.  3. 20. 23.]
74   cord_individul_obj[indivial_i, :] = [ 9.  3. 20. 23.]
75
76   min(cord_individul_obj[:, 3]) = 23.0
77   historl_G_best_iter[iter, 3] = 23.0
78 Begin iteration:
79

```

```

80 iter = 3
81   cord_individul_obj[indivial_i,:] = [ 0. 4. 70. 74.]
82   cord_individul_obj[indivial_i,:] = [ 1. 3. 20. 23.]
83   cord_individul_obj[indivial_i,:] = [ 2. 4. 36. 40.]
84   cord_individul_obj[indivial_i,:] = [ 3. 4. 36. 40.]
85   cord_individul_obj[indivial_i,:] = [ 4. 4. 36. 40.]
86   cord_individul_obj[indivial_i,:] = [ 5. 4. 36. 40.]
87   cord_individul_obj[indivial_i,:] = [ 6. 3. 12. 15.]
88   cord_individul_obj[indivial_i,:] = [ 7. 4. 18. 22.]
89   cord_individul_obj[indivial_i,:] = [ 8. 3. 80. 83.]
90   cord_individul_obj[indivial_i,:] = [ 9. 4. 18. 22.]
91
92   min(cord_individul_obj[:, 3]) = 15.0
93   historl_G_best_iter[iter, 3] = 15.0
94   Begin iteration:
95
96   iter = 4
97     cord_individul_obj[indivial_i,:] = [ 0. 4. 20. 24.]
98     cord_individul_obj[indivial_i,:] = [ 1. 5. 56. 61.]
99     cord_individul_obj[indivial_i,:] = [ 2. 5. 20. 25.]
100    cord_individul_obj[indivial_i,:] = [ 3. 4. 92. 96.]
101    cord_individul_obj[indivial_i,:] = [ 4. 5. 12. 17.]
102    cord_individul_obj[indivial_i,:] = [ 5. 5. 8. 13.]
103    cord_individul_obj[indivial_i,:] = [ 6. 5. 8. 13.]
104    cord_individul_obj[indivial_i,:] = [ 7. 5. 12. 17.]
105    cord_individul_obj[indivial_i,:] = [ 8. 3. 12. 15.]
106    cord_individul_obj[indivial_i,:] = [ 9. 5. 56. 61.]
107
108    min(cord_individul_obj[:, 3]) = 13.0
109    historl_G_best_iter[iter, 3] = 13.0
110    Begin iteration:
111
112    iter = 5
113      cord_individul_obj[indivial_i,:] = [ 0. 5. 18. 23.]
114      cord_individul_obj[indivial_i,:] = [ 1. 4. 12. 16.]
115      cord_individul_obj[indivial_i,:] = [ 2. 5. 12. 17.]
116      cord_individul_obj[indivial_i,:] = [ 3. 5. 8. 13.]
117      cord_individul_obj[indivial_i,:] = [ 4. 5. 12. 17.]
118      cord_individul_obj[indivial_i,:] = [ 5. 4. 8. 12.]
119      cord_individul_obj[indivial_i,:] = [ 6. 3. 30. 33.]
120      cord_individul_obj[indivial_i,:] = [ 7. 5. 16. 21.]
121      cord_individul_obj[indivial_i,:] = [ 8. 5. 8. 13.]
122      cord_individul_obj[indivial_i,:] = [ 9. 3. 12. 15.]
123
124      min(cord_individul_obj[:, 3]) = 12.0
125      historl_G_best_iter[iter, 3] = 12.0
126      Begin iteration:
127
128      iter = 6
129        cord_individul_obj[indivial_i,:] = [ 0. 5. 20. 25.]
130        cord_individul_obj[indivial_i,:] = [ 1. 5. 32. 37.]
131        cord_individul_obj[indivial_i,:] = [ 2. 5. 12. 17.]
132        cord_individul_obj[indivial_i,:] = [ 3. 5. 18. 23.]
133        cord_individul_obj[indivial_i,:] = [ 4. 4. 8. 12.]
134        cord_individul_obj[indivial_i,:] = [ 5. 5. 8. 13.]
135        cord_individul_obj[indivial_i,:] = [ 6. 4. 8. 12.]
136        cord_individul_obj[indivial_i,:] = [ 7. 5. 12. 17.]
137        cord_individul_obj[indivial_i,:] = [ 8. 5. 104. 109.]
138        cord_individul_obj[indivial_i,:] = [ 9. 5. 12. 17.]
139
140        min(cord_individul_obj[:, 3]) = 12.0
141        historl_G_best_iter[iter, 3] = 12.0
142        Begin iteration:
143
144        iter = 7
145          cord_individul_obj[indivial_i,:] = [ 0. 4. 44. 48.]
146          cord_individul_obj[indivial_i,:] = [ 1. 3. 134. 137.]
147          cord_individul_obj[indivial_i,:] = [ 2. 3. 72. 75.]
148          cord_individul_obj[indivial_i,:] = [ 3. 3. 52. 55.]
149          cord_individul_obj[indivial_i,:] = [ 4. 5. 32. 37.]
150          cord_individul_obj[indivial_i,:] = [ 5. 4. 44. 48.]
151          cord_individul_obj[indivial_i,:] = [ 6. 5. 44. 49.]
152          cord_individul_obj[indivial_i,:] = [ 7. 3. 32. 35.]
153          cord_individul_obj[indivial_i,:] = [ 8. 4. 8. 12.]
154          cord_individul_obj[indivial_i,:] = [ 9. 4. 70. 74.]
155
156          min(cord_individul_obj[:, 3]) = 12.0
157          historl_G_best_iter[iter, 3] = 12.0
158          Begin iteration:
159
160          iter = 8
161            cord_individul_obj[indivial_i,:] = [ 0. 3. 72. 75.]
162            cord_individul_obj[indivial_i,:] = [ 1. 4. 8. 12.]
163            cord_individul_obj[indivial_i,:] = [ 2. 5. 26. 31.]

```

```

164   cord_individul_obj[indivial_i,:] = [ 3. 3. 66. 69.]
165   cord_individul_obj[indivial_i,:] = [ 4. 5. 32. 37.]
166   cord_individul_obj[indivial_i,:] = [ 5. 5. 32. 37.]
167   cord_individul_obj[indivial_i,:] = [ 6. 5. 32. 37.]
168   cord_individul_obj[indivial_i,:] = [ 7. 5. 18. 23.]
169   cord_individul_obj[indivial_i,:] = [ 8. 4. 78. 82.]
170   cord_individul_obj[indivial_i,:] = [ 9. 5. 80. 85.]
171
172   min(cord_individul_obj[:, 3]) = 12.0
173   historl_G_best_iter[iter, 3] = 12.0
174   Begin iteration:
175
176   iter = 9
177   cord_individul_obj[indivial_i,:] = [ 0. 3. 42. 45.]
178   cord_individul_obj[indivial_i,:] = [ 1. 5. 108. 113.]
179   cord_individul_obj[indivial_i,:] = [ 2. 3. 62. 65.]
180   cord_individul_obj[indivial_i,:] = [ 3. 3. 92. 95.]
181   cord_individul_obj[indivial_i,:] = [ 4. 3. 56. 59.]
182   cord_individul_obj[indivial_i,:] = [ 5. 3. 56. 59.]
183   cord_individul_obj[indivial_i,:] = [ 6. 4. 44. 48.]
184   cord_individul_obj[indivial_i,:] = [ 7. 4. 44. 48.]
185   cord_individul_obj[indivial_i,:] = [ 8. 4. 44. 48.]
186   cord_individul_obj[indivial_i,:] = [ 9. 4. 8. 12.]
187
188   min(cord_individul_obj[:, 3]) = 12.0
189   historl_G_best_iter[iter, 3] = 12.0
190   Begin iteration:
191
192   iter = 10
193   cord_individul_obj[indivial_i,:] = [ 0. 4. 70. 74.]
194   cord_individul_obj[indivial_i,:] = [ 1. 4. 8. 12.]
195   cord_individul_obj[indivial_i,:] = [ 2. 5. 44. 49.]
196   cord_individul_obj[indivial_i,:] = [ 3. 3. 38. 41.]
197   cord_individul_obj[indivial_i,:] = [ 4. 5. 44. 49.]
198   cord_individul_obj[indivial_i,:] = [ 5. 5. 44. 49.]
199   cord_individul_obj[indivial_i,:] = [ 6. 5. 44. 49.]
200   cord_individul_obj[indivial_i,:] = [ 7. 5. 26. 31.]
201   cord_individul_obj[indivial_i,:] = [ 8. 4. 98. 102.]
202   cord_individul_obj[indivial_i,:] = [ 9. 5. 44. 49.]
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 = 92.0
214   Proportion_of_area = 0.08518518518518518
215   BEST_CHROM =
216   berth: [ 2.5 26. 15. 20.5 6.5 10. ]
217   time: [0. 0. 0. 0. 0. 0.]
218   num_QC: [2. 2. 4. 2. 2. 3.]
219   Objective function values and some other indicators:
220   Obj0 = 4.00      Obj1 = 8.00      Obj0 + Obj1 = 12.00
221   Total movement of crane: 8.00
222   Total waiting time in berth position: 0.00
223   Total index of q during berthing: 532.00
224   Specific arrangement for each vessel:
225   V_id: 0          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:
      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   V_id: 2          li: 6.0          xi: 15.0          bow of i: 12.0          tail of i: 18.0          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: 260.0          work
      load_i: 260.0          work load gap_i: 0
228   V_id: 3          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
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: 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: 10.0          bow of i: 8.0          tail of i: 12.0          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: 38 s
233   End
234

```