

unknown

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1 "E:\我的云盘\3 项目\1 项目\1 项目\1_LW_00002\6 0000\2 python code\01_My_Python_Code\Scripts\python.exe" "D:\Python\Pycharm\setrouted\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=55209
2
3 import sys; print('Python %s on %s' % (sys.version, sys.platform))
4 sys.path.extend(['E:\我的云盘\3 项目\1 项目\1 项目\1_LW_00002\6 0000\2 python code\01_My_Python_Code', 'E:/1 项目/3 项目/1 项目/1_LW_00002\6 0000\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 项目/3 项目/1 项目/1_LW_00002\6 0000\2 python code\01_My_Python_Code/main_BACASP_offical_PSO_2D_Bin_berth_line.py', wdir='E:/1 项目/3 项目/1 项目/1_LW_00002\6 0000\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 = 21
23   maxIter_num = 30
24   W_inertia = 2.0
25   oder_type_num = 10
26   c1 = 2.0
27   c2 = 1.0
28   r1 = 0.12632629427191444
29   r2 = 0.12632629427191444
30 Begin iteration:
31
32 iter = 0
33   cord_individual_obj[individual_i, :] = [ 0.  3. 156. 159.]
34   cord_individual_obj[individual_i, :] = [ 1.  3. 164. 167.]
35   cord_individual_obj[individual_i, :] = [ 2.  3. 100. 103.]
36   cord_individual_obj[individual_i, :] = [ 3.  3. 132. 135.]
37   cord_individual_obj[individual_i, :] = [ 4.  3. 72. 75.]
38   cord_individual_obj[individual_i, :] = [ 5.  3. 148. 151.]
39   cord_individual_obj[individual_i, :] = [ 6.  3. 84. 87.]
40   cord_individual_obj[individual_i, :] = [ 7.  3. 106. 109.]
41   cord_individual_obj[individual_i, :] = [ 8.  3. 130. 133.]
42   cord_individual_obj[individual_i, :] = [ 9.  3. 156. 159.]
43
44 min(cord_individual_obj[:, 3]) = 75.0
45 historl_G_best_iter[iter, 3] = 75.0
46 Begin iteration:
47
48 iter = 1
49   cord_individual_obj[individual_i, :] = [ 0.  4. 76. 80.]
50   cord_individual_obj[individual_i, :] = [ 1.  3. 72. 75.]
51   cord_individual_obj[individual_i, :] = [ 2.  4. 12. 16.]
52   cord_individual_obj[individual_i, :] = [ 3.  6. 44. 50.]
53   cord_individual_obj[individual_i, :] = [ 4.  4. 92. 96.]
54   cord_individual_obj[individual_i, :] = [ 5.  6. 64. 70.]
55   cord_individual_obj[individual_i, :] = [ 6.  4. 70. 74.]
56   cord_individual_obj[individual_i, :] = [ 7.  5. 20. 25.]
57   cord_individual_obj[individual_i, :] = [ 8.  5. 28. 33.]
58   cord_individual_obj[individual_i, :] = [ 9.  6. 44. 50.]
59
60 min(cord_individual_obj[:, 3]) = 16.0
61 historl_G_best_iter[iter, 3] = 16.0
62 Begin iteration:
63
64 iter = 2
65   cord_individual_obj[individual_i, :] = [ 0.  6. 48. 54.]
66   cord_individual_obj[individual_i, :] = [ 1.  4. 72. 76.]
67   cord_individual_obj[individual_i, :] = [ 2.  6. 12. 18.]
68   cord_individual_obj[individual_i, :] = [ 3.  5. 40. 45.]
69   cord_individual_obj[individual_i, :] = [ 4.  4. 12. 16.]
70   cord_individual_obj[individual_i, :] = [ 5.  5. 72. 77.]
71   cord_individual_obj[individual_i, :] = [ 6.  5. 126. 131.]
72   cord_individual_obj[individual_i, :] = [ 7.  3. 114. 117.]
73   cord_individual_obj[individual_i, :] = [ 8.  3. 90. 93.]
74   cord_individual_obj[individual_i, :] = [ 9.  6. 58. 64.]
75
76 min(cord_individual_obj[:, 3]) = 16.0
77 historl_G_best_iter[iter, 3] = 16.0
78 Begin iteration:
79

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80 iter = 3
81 cord_individual_obj[indivial_i, :] = [ 0. 5. 126. 131.]
82 cord_individual_obj[indivial_i, :] = [ 1. 5. 136. 141.]
83 cord_individual_obj[indivial_i, :] = [ 2. 6. 12. 18.]
84 cord_individual_obj[indivial_i, :] = [ 3. 5. 88. 93.]
85 cord_individual_obj[indivial_i, :] = [ 4. 6. 24. 30.]
86 cord_individual_obj[indivial_i, :] = [ 5. 6. 98. 104.]
87 cord_individual_obj[indivial_i, :] = [ 6. 4. 12. 16.]
88 cord_individual_obj[indivial_i, :] = [ 7. 4. 72. 76.]
89 cord_individual_obj[indivial_i, :] = [ 8. 3. 94. 97.]
90 cord_individual_obj[indivial_i, :] = [ 9. 6. 66. 72.]
91
92 min(cord_individual_obj[:, 3]) = 16.0
93 historl_G_best_iter[iter, 3] = 16.0
94 Begin iteration:
95
96 iter = 4
97 cord_individual_obj[indivial_i, :] = [ 0. 3. 72. 75.]
98 cord_individual_obj[indivial_i, :] = [ 1. 4. 12. 16.]
99 cord_individual_obj[indivial_i, :] = [ 2. 3. 204. 207.]
100 cord_individual_obj[indivial_i, :] = [ 3. 3. 80. 83.]
101 cord_individual_obj[indivial_i, :] = [ 4. 6. 32. 38.]
102 cord_individual_obj[indivial_i, :] = [ 5. 3. 134. 137.]
103 cord_individual_obj[indivial_i, :] = [ 6. 5. 60. 65.]
104 cord_individual_obj[indivial_i, :] = [ 7. 3. 104. 107.]
105 cord_individual_obj[indivial_i, :] = [ 8. 6. 54. 60.]
106 cord_individual_obj[indivial_i, :] = [ 9. 5. 40. 45.]
107
108 min(cord_individual_obj[:, 3]) = 16.0
109 historl_G_best_iter[iter, 3] = 16.0
110 Begin iteration:
111
112 iter = 5
113 cord_individual_obj[indivial_i, :] = [ 0. 6. 8. 14.]
114 cord_individual_obj[indivial_i, :] = [ 1. 3. 88. 91.]
115 cord_individual_obj[indivial_i, :] = [ 2. 4. 12. 16.]
116 cord_individual_obj[indivial_i, :] = [ 3. 4. 50. 54.]
117 cord_individual_obj[indivial_i, :] = [ 4. 6. 24. 30.]
118 cord_individual_obj[indivial_i, :] = [ 5. 3. 82. 85.]
119 cord_individual_obj[indivial_i, :] = [ 6. 3. 150. 153.]
120 cord_individual_obj[indivial_i, :] = [ 7. 3. 84. 87.]
121 cord_individual_obj[indivial_i, :] = [ 8. 3. 96. 99.]
122 cord_individual_obj[indivial_i, :] = [ 9. 5. 56. 61.]
123
124 min(cord_individual_obj[:, 3]) = 14.0
125 historl_G_best_iter[iter, 3] = 14.0
126 Begin iteration:
127
128 iter = 6
129 cord_individual_obj[indivial_i, :] = [ 0. 5. 24. 29.]
130 cord_individual_obj[indivial_i, :] = [ 1. 5. 20. 25.]
131 cord_individual_obj[indivial_i, :] = [ 2. 4. 138. 142.]
132 cord_individual_obj[indivial_i, :] = [ 3. 6. 12. 18.]
133 cord_individual_obj[indivial_i, :] = [ 4. 4. 90. 94.]
134 cord_individual_obj[indivial_i, :] = [ 5. 5. 52. 57.]
135 cord_individual_obj[indivial_i, :] = [ 6. 6. 8. 14.]
136 cord_individual_obj[indivial_i, :] = [ 7. 4. 130. 134.]
137 cord_individual_obj[indivial_i, :] = [ 8. 5. 48. 53.]
138 cord_individual_obj[indivial_i, :] = [ 9. 5. 48. 53.]
139
140 min(cord_individual_obj[:, 3]) = 14.0
141 historl_G_best_iter[iter, 3] = 14.0
142 Begin iteration:
143
144 iter = 7
145 cord_individual_obj[indivial_i, :] = [ 0. 5. 96. 101.]
146 cord_individual_obj[indivial_i, :] = [ 1. 4. 30. 34.]
147 cord_individual_obj[indivial_i, :] = [ 2. 6. 8. 14.]
148 cord_individual_obj[indivial_i, :] = [ 3. 5. 42. 47.]
149 cord_individual_obj[indivial_i, :] = [ 4. 6. 8. 14.]
150 cord_individual_obj[indivial_i, :] = [ 5. 6. 16. 22.]
151 cord_individual_obj[indivial_i, :] = [ 6. 4. 24. 28.]
152 cord_individual_obj[indivial_i, :] = [ 7. 4. 28. 32.]
153 cord_individual_obj[indivial_i, :] = [ 8. 3. 112. 115.]
154 cord_individual_obj[indivial_i, :] = [ 9. 5. 98. 103.]
155
156 min(cord_individual_obj[:, 3]) = 14.0
157 historl_G_best_iter[iter, 3] = 14.0
158 Begin iteration:
159
160 iter = 8
161 cord_individual_obj[indivial_i, :] = [ 0. 5. 36. 41.]
162 cord_individual_obj[indivial_i, :] = [ 1. 5. 40. 45.]
163 cord_individual_obj[indivial_i, :] = [ 2. 4. 18. 22.]

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164 cord_individual_obj[indivial_i,:] = [ 3. 6. 32. 38.]
165 cord_individual_obj[indivial_i,:] = [ 4. 4. 62. 66.]
166 cord_individual_obj[indivial_i,:] = [ 5. 6. 68. 74.]
167 cord_individual_obj[indivial_i,:] = [ 6. 4. 50. 54.]
168 cord_individual_obj[indivial_i,:] = [ 7. 3. 44. 47.]
169 cord_individual_obj[indivial_i,:] = [ 8. 6. 8. 14.]
170 cord_individual_obj[indivial_i,:] = [ 9. 5. 12. 17.]
171
172 min(cord_individual_obj[:,3]) = 14.0
173 historl_G_best_iter[iter,3] = 14.0
174 Begin iteration:
175
176 iter = 9
177 cord_individual_obj[indivial_i,:] = [ 0. 6. 16. 22.]
178 cord_individual_obj[indivial_i,:] = [ 1. 3. 136. 139.]
179 cord_individual_obj[indivial_i,:] = [ 2. 6. 28. 34.]
180 cord_individual_obj[indivial_i,:] = [ 3. 3. 92. 95.]
181 cord_individual_obj[indivial_i,:] = [ 4. 3. 158. 161.]
182 cord_individual_obj[indivial_i,:] = [ 5. 6. 8. 14.]
183 cord_individual_obj[indivial_i,:] = [ 6. 4. 58. 62.]
184 cord_individual_obj[indivial_i,:] = [ 7. 3. 152. 155.]
185 cord_individual_obj[indivial_i,:] = [ 8. 5. 78. 83.]
186 cord_individual_obj[indivial_i,:] = [ 9. 4. 90. 94.]
187
188 min(cord_individual_obj[:,3]) = 14.0
189 historl_G_best_iter[iter,3] = 14.0
190 Begin iteration:
191
192 iter = 10
193 cord_individual_obj[indivial_i,:] = [ 0. 5. 36. 41.]
194 cord_individual_obj[indivial_i,:] = [ 1. 5. 40. 45.]
195 cord_individual_obj[indivial_i,:] = [ 2. 6. 12. 18.]
196 cord_individual_obj[indivial_i,:] = [ 3. 5. 120. 125.]
197 cord_individual_obj[indivial_i,:] = [ 4. 6. 8. 14.]
198 cord_individual_obj[indivial_i,:] = [ 5. 6. 16. 22.]
199 cord_individual_obj[indivial_i,:] = [ 6. 3. 60. 63.]
200 cord_individual_obj[indivial_i,:] = [ 7. 4. 44. 48.]
201 cord_individual_obj[indivial_i,:] = [ 8. 3. 26. 29.]
202 cord_individual_obj[indivial_i,:] = [ 9. 5. 32. 37.]
203
204 min(cord_individual_obj[:,3]) = 14.0
205 historl_G_best_iter[iter,3] = 14.0
206 Begin iteration:
207
208 iter = 11
209 cord_individual_obj[indivial_i,:] = [ 0. 6. 8. 14.]
210 cord_individual_obj[indivial_i,:] = [ 1. 4. 38. 42.]
211 cord_individual_obj[indivial_i,:] = [ 2. 6. 12. 18.]
212 cord_individual_obj[indivial_i,:] = [ 3. 6. 8. 14.]
213 cord_individual_obj[indivial_i,:] = [ 4. 6. 16. 22.]
214 cord_individual_obj[indivial_i,:] = [ 5. 3. 56. 59.]
215 cord_individual_obj[indivial_i,:] = [ 6. 4. 68. 72.]
216 cord_individual_obj[indivial_i,:] = [ 7. 3. 50. 53.]
217 cord_individual_obj[indivial_i,:] = [ 8. 5. 44. 49.]
218 cord_individual_obj[indivial_i,:] = [ 9. 6. 70. 76.]
219
220 min(cord_individual_obj[:,3]) = 14.0
221 historl_G_best_iter[iter,3] = 14.0
222 Begin iteration:
223
224 iter = 12
225 cord_individual_obj[indivial_i,:] = [ 0. 5. 34. 39.]
226 cord_individual_obj[indivial_i,:] = [ 1. 5. 54. 59.]
227 cord_individual_obj[indivial_i,:] = [ 2. 5. 26. 31.]
228 cord_individual_obj[indivial_i,:] = [ 3. 6. 8. 14.]
229 cord_individual_obj[indivial_i,:] = [ 4. 3. 100. 103.]
230 cord_individual_obj[indivial_i,:] = [ 5. 5. 68. 73.]
231 cord_individual_obj[indivial_i,:] = [ 6. 3. 156. 159.]
232 cord_individual_obj[indivial_i,:] = [ 7. 4. 134. 138.]
233 cord_individual_obj[indivial_i,:] = [ 8. 3. 136. 139.]
234 cord_individual_obj[indivial_i,:] = [ 9. 6. 8. 14.]
235
236 min(cord_individual_obj[:,3]) = 14.0
237 historl_G_best_iter[iter,3] = 14.0
238 Begin iteration:
239
240 iter = 13
241 cord_individual_obj[indivial_i,:] = [ 0. 3. 32. 35.]
242 cord_individual_obj[indivial_i,:] = [ 1. 4. 38. 42.]
243 cord_individual_obj[indivial_i,:] = [ 2. 5. 84. 89.]
244 cord_individual_obj[indivial_i,:] = [ 3. 3. 132. 135.]
245 cord_individual_obj[indivial_i,:] = [ 4. 5. 26. 31.]
246 cord_individual_obj[indivial_i,:] = [ 5. 6. 24. 30.]
247 cord_individual_obj[indivial_i,:] = [ 6. 6. 8. 14.]

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248     cord_individual_obj[indivial_i,:] = [ 7. 3. 68. 71.]
249     cord_individual_obj[indivial_i,:] = [ 8. 5. 30. 35.]
250     cord_individual_obj[indivial_i,:] = [ 9. 4. 70. 74.]
251
252 min(cord_individual_obj[:,3]) = 14.0
253 historl_G_best_iter[iter,3] = 14.0
254 Begin iteration:
255
256 iter = 14
257     cord_individual_obj[indivial_i,:] = [ 0. 4. 18. 22.]
258     cord_individual_obj[indivial_i,:] = [ 1. 5. 18. 23.]
259     cord_individual_obj[indivial_i,:] = [ 2. 5. 18. 23.]
260     cord_individual_obj[indivial_i,:] = [ 3. 6. 8. 14.]
261     cord_individual_obj[indivial_i,:] = [ 4. 6. 8. 14.]
262     cord_individual_obj[indivial_i,:] = [ 5. 3. 152. 155.]
263     cord_individual_obj[indivial_i,:] = [ 6. 4. 18. 22.]
264     cord_individual_obj[indivial_i,:] = [ 7. 4. 34. 38.]
265     cord_individual_obj[indivial_i,:] = [ 8. 3. 36. 39.]
266     cord_individual_obj[indivial_i,:] = [ 9. 4. 48. 52.]
267
268 min(cord_individual_obj[:,3]) = 14.0
269 historl_G_best_iter[iter,3] = 14.0
270 Begin iteration:
271
272 iter = 15
273     cord_individual_obj[indivial_i,:] = [ 0. 4. 18. 22.]
274     cord_individual_obj[indivial_i,:] = [ 1. 5. 18. 23.]
275     cord_individual_obj[indivial_i,:] = [ 2. 5. 132. 137.]
276     cord_individual_obj[indivial_i,:] = [ 3. 5. 18. 23.]
277     cord_individual_obj[indivial_i,:] = [ 4. 6. 8. 14.]
278     cord_individual_obj[indivial_i,:] = [ 5. 6. 8. 14.]
279     cord_individual_obj[indivial_i,:] = [ 6. 4. 44. 48.]
280     cord_individual_obj[indivial_i,:] = [ 7. 4. 18. 22.]
281     cord_individual_obj[indivial_i,:] = [ 8. 3. 24. 27.]
282     cord_individual_obj[indivial_i,:] = [ 9. 5. 28. 33.]
283
284 min(cord_individual_obj[:,3]) = 14.0
285 historl_G_best_iter[iter,3] = 14.0
286 Begin iteration:
287
288 iter = 16
289     cord_individual_obj[indivial_i,:] = [ 0. 5. 36. 41.]
290     cord_individual_obj[indivial_i,:] = [ 1. 4. 36. 40.]
291     cord_individual_obj[indivial_i,:] = [ 2. 6. 8. 14.]
292     cord_individual_obj[indivial_i,:] = [ 3. 5. 88. 93.]
293     cord_individual_obj[indivial_i,:] = [ 4. 5. 112. 117.]
294     cord_individual_obj[indivial_i,:] = [ 5. 3. 80. 83.]
295     cord_individual_obj[indivial_i,:] = [ 6. 4. 50. 54.]
296     cord_individual_obj[indivial_i,:] = [ 7. 4. 48. 52.]
297     cord_individual_obj[indivial_i,:] = [ 8. 5. 34. 39.]
298     cord_individual_obj[indivial_i,:] = [ 9. 5. 16. 21.]
299
300 min(cord_individual_obj[:,3]) = 14.0
301 historl_G_best_iter[iter,3] = 14.0
302 Begin iteration:
303
304 iter = 17
305     cord_individual_obj[indivial_i,:] = [ 0. 5. 36. 41.]
306     cord_individual_obj[indivial_i,:] = [ 1. 5. 64. 69.]
307     cord_individual_obj[indivial_i,:] = [ 2. 5. 34. 39.]
308     cord_individual_obj[indivial_i,:] = [ 3. 6. 68. 74.]
309     cord_individual_obj[indivial_i,:] = [ 4. 6. 8. 14.]
310     cord_individual_obj[indivial_i,:] = [ 5. 6. 44. 50.]
311     cord_individual_obj[indivial_i,:] = [ 6. 3. 74. 77.]
312     cord_individual_obj[indivial_i,:] = [ 7. 4. 44. 48.]
313     cord_individual_obj[indivial_i,:] = [ 8. 5. 48. 53.]
314     cord_individual_obj[indivial_i,:] = [ 9. 5. 54. 59.]
315
316 min(cord_individual_obj[:,3]) = 14.0
317 historl_G_best_iter[iter,3] = 14.0
318 Begin iteration:
319
320 iter = 18
321     cord_individual_obj[indivial_i,:] = [ 0. 3. 54. 57.]
322     cord_individual_obj[indivial_i,:] = [ 1. 4. 38. 42.]
323     cord_individual_obj[indivial_i,:] = [ 2. 6. 20. 26.]
324     cord_individual_obj[indivial_i,:] = [ 3. 6. 72. 78.]
325     cord_individual_obj[indivial_i,:] = [ 4. 6. 8. 14.]
326     cord_individual_obj[indivial_i,:] = [ 5. 5. 62. 67.]
327     cord_individual_obj[indivial_i,:] = [ 6. 6. 8. 14.]
328     cord_individual_obj[indivial_i,:] = [ 7. 5. 22. 27.]
329     cord_individual_obj[indivial_i,:] = [ 8. 3. 100. 103.]
330     cord_individual_obj[indivial_i,:] = [ 9. 6. 34. 40.]
331
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332 min(cord_individual_obj[:, 3]) = 14.0
333 historl_G_best_iter[iter, 3] = 14.0
334 Begin iteration:
335
336 iter = 19
337 cord_individual_obj[indivial_i, :] = [ 0. 6. 18. 24.]
338 cord_individual_obj[indivial_i, :] = [ 1. 5. 116. 121.]
339 cord_individual_obj[indivial_i, :] = [ 2. 5. 82. 87.]
340 cord_individual_obj[indivial_i, :] = [ 3. 5. 68. 73.]
341 cord_individual_obj[indivial_i, :] = [ 4. 5. 90. 95.]
342 cord_individual_obj[indivial_i, :] = [ 5. 6. 44. 50.]
343 cord_individual_obj[indivial_i, :] = [ 6. 4. 24. 28.]
344 cord_individual_obj[indivial_i, :] = [ 7. 3. 116. 119.]
345 cord_individual_obj[indivial_i, :] = [ 8. 6. 8. 14.]
346 cord_individual_obj[indivial_i, :] = [ 9. 5. 20. 25.]
347
348 min(cord_individual_obj[:, 3]) = 14.0
349 historl_G_best_iter[iter, 3] = 14.0
350 Begin iteration:
351
352 iter = 20
353 cord_individual_obj[indivial_i, :] = [ 0. 3. 152. 155.]
354 cord_individual_obj[indivial_i, :] = [ 1. 6. 8. 14.]
355 cord_individual_obj[indivial_i, :] = [ 2. 6. 44. 50.]
356 cord_individual_obj[indivial_i, :] = [ 3. 5. 48. 53.]
357 cord_individual_obj[indivial_i, :] = [ 4. 6. 18. 24.]
358 cord_individual_obj[indivial_i, :] = [ 5. 4. 50. 54.]
359 cord_individual_obj[indivial_i, :] = [ 6. 3. 38. 41.]
360 cord_individual_obj[indivial_i, :] = [ 7. 3. 102. 105.]
361 cord_individual_obj[indivial_i, :] = [ 8. 5. 32. 37.]
362 cord_individual_obj[indivial_i, :] = [ 9. 5. 96. 101.]
363
364 min(cord_individual_obj[:, 3]) = 14.0
365 historl_G_best_iter[iter, 3] = 14.0
366 Begin iteration:
367
368 iter = 21
369 cord_individual_obj[indivial_i, :] = [ 0. 6. 8. 14.]
370 cord_individual_obj[indivial_i, :] = [ 1. 5. 58. 63.]
371 cord_individual_obj[indivial_i, :] = [ 2. 5. 48. 53.]
372 cord_individual_obj[indivial_i, :] = [ 3. 4. 60. 64.]
373 cord_individual_obj[indivial_i, :] = [ 4. 5. 18. 23.]
374 cord_individual_obj[indivial_i, :] = [ 5. 5. 148. 153.]
375 cord_individual_obj[indivial_i, :] = [ 6. 4. 58. 62.]
376 cord_individual_obj[indivial_i, :] = [ 7. 3. 74. 77.]
377 cord_individual_obj[indivial_i, :] = [ 8. 4. 44. 48.]
378 cord_individual_obj[indivial_i, :] = [ 9. 4. 38. 42.]
379
380 min(cord_individual_obj[:, 3]) = 14.0
381 historl_G_best_iter[iter, 3] = 14.0
382 Begin iteration:
383
384 iter = 22
385 cord_individual_obj[indivial_i, :] = [ 0. 4. 32. 36.]
386 cord_individual_obj[indivial_i, :] = [ 1. 4. 38. 42.]
387 cord_individual_obj[indivial_i, :] = [ 2. 6. 44. 50.]
388 cord_individual_obj[indivial_i, :] = [ 3. 4. 98. 102.]
389 cord_individual_obj[indivial_i, :] = [ 4. 6. 18. 24.]
390 cord_individual_obj[indivial_i, :] = [ 5. 6. 8. 14.]
391 cord_individual_obj[indivial_i, :] = [ 6. 3. 78. 81.]
392 cord_individual_obj[indivial_i, :] = [ 7. 4. 66. 70.]
393 cord_individual_obj[indivial_i, :] = [ 8. 4. 50. 54.]
394 cord_individual_obj[indivial_i, :] = [ 9. 3. 110. 113.]
395
396 min(cord_individual_obj[:, 3]) = 14.0
397 historl_G_best_iter[iter, 3] = 14.0
398 Begin iteration:
399
400 iter = 23
401 cord_individual_obj[indivial_i, :] = [ 0. 5. 52. 57.]
402 cord_individual_obj[indivial_i, :] = [ 1. 5. 44. 49.]
403 cord_individual_obj[indivial_i, :] = [ 2. 5. 74. 79.]
404 cord_individual_obj[indivial_i, :] = [ 3. 6. 24. 30.]
405 cord_individual_obj[indivial_i, :] = [ 4. 5. 18. 23.]
406 cord_individual_obj[indivial_i, :] = [ 5. 4. 42. 46.]
407 cord_individual_obj[indivial_i, :] = [ 6. 4. 98. 102.]
408 cord_individual_obj[indivial_i, :] = [ 7. 3. 68. 71.]
409 cord_individual_obj[indivial_i, :] = [ 8. 4. 70. 74.]
410 cord_individual_obj[indivial_i, :] = [ 9. 6. 8. 14.]
411
412 min(cord_individual_obj[:, 3]) = 14.0
413 historl_G_best_iter[iter, 3] = 14.0
414 Begin iteration:
415

```

```

416 iter = 24
417 cord_individual_obj[indivial_i, :] = [ 0.  6. 12. 18.]
418 cord_individual_obj[indivial_i, :] = [ 1.  4. 106. 110.]
419 cord_individual_obj[indivial_i, :] = [ 2.  5. 66. 71.]
420 cord_individual_obj[indivial_i, :] = [ 3.  4. 50. 54.]
421 cord_individual_obj[indivial_i, :] = [ 4.  6. 8. 14.]
422 cord_individual_obj[indivial_i, :] = [ 5.  4. 74. 78.]
423 cord_individual_obj[indivial_i, :] = [ 6.  6. 8. 14.]
424 cord_individual_obj[indivial_i, :] = [ 7.  4. 138. 142.]
425 cord_individual_obj[indivial_i, :] = [ 8.  4. 38. 42.]
426 cord_individual_obj[indivial_i, :] = [ 9.  3. 148. 151.]
427
428 min(cord_individual_obj[:, 3]) = 14.0
429 historl_G_best_iter[iter, 3] = 14.0
430 Begin iteration:
431
432 iter = 25
433 cord_individual_obj[indivial_i, :] = [ 0.  6. 12. 18.]
434 cord_individual_obj[indivial_i, :] = [ 1.  5. 44. 49.]
435 cord_individual_obj[indivial_i, :] = [ 2.  6. 70. 76.]
436 cord_individual_obj[indivial_i, :] = [ 3.  6. 32. 38.]
437 cord_individual_obj[indivial_i, :] = [ 4.  5. 32. 37.]
438 cord_individual_obj[indivial_i, :] = [ 5.  5. 68. 73.]
439 cord_individual_obj[indivial_i, :] = [ 6.  4. 26. 30.]
440 cord_individual_obj[indivial_i, :] = [ 7.  3. 170. 173.]
441 cord_individual_obj[indivial_i, :] = [ 8.  4. 72. 76.]
442 cord_individual_obj[indivial_i, :] = [ 9.  6. 8. 14.]
443
444 min(cord_individual_obj[:, 3]) = 14.0
445 historl_G_best_iter[iter, 3] = 14.0
446 Begin iteration:
447
448 iter = 26
449 cord_individual_obj[indivial_i, :] = [ 0.  4. 44. 48.]
450 cord_individual_obj[indivial_i, :] = [ 1.  5. 52. 57.]
451 cord_individual_obj[indivial_i, :] = [ 2.  5. 44. 49.]
452 cord_individual_obj[indivial_i, :] = [ 3.  5. 26. 31.]
453 cord_individual_obj[indivial_i, :] = [ 4.  6. 12. 18.]
454 cord_individual_obj[indivial_i, :] = [ 5.  4. 92. 96.]
455 cord_individual_obj[indivial_i, :] = [ 6.  4. 36. 40.]
456 cord_individual_obj[indivial_i, :] = [ 7.  6. 8. 14.]
457 cord_individual_obj[indivial_i, :] = [ 8.  4. 44. 48.]
458 cord_individual_obj[indivial_i, :] = [ 9.  3. 56. 59.]
459
460 min(cord_individual_obj[:, 3]) = 14.0
461 historl_G_best_iter[iter, 3] = 14.0
462 Begin iteration:
463
464 iter = 27
465 cord_individual_obj[indivial_i, :] = [ 0.  4. 62. 66.]
466 cord_individual_obj[indivial_i, :] = [ 1.  4. 12. 16.]
467 cord_individual_obj[indivial_i, :] = [ 2.  6. 20. 26.]
468 cord_individual_obj[indivial_i, :] = [ 3.  4. 88. 92.]
469 cord_individual_obj[indivial_i, :] = [ 4.  5. 108. 113.]
470 cord_individual_obj[indivial_i, :] = [ 5.  6. 8. 14.]
471 cord_individual_obj[indivial_i, :] = [ 6.  4. 56. 60.]
472 cord_individual_obj[indivial_i, :] = [ 7.  4. 12. 16.]
473 cord_individual_obj[indivial_i, :] = [ 8.  5. 20. 25.]
474 cord_individual_obj[indivial_i, :] = [ 9.  5. 16. 21.]
475
476 min(cord_individual_obj[:, 3]) = 14.0
477 historl_G_best_iter[iter, 3] = 14.0
478 Begin iteration:
479
480 iter = 28
481 cord_individual_obj[indivial_i, :] = [ 0.  4. 18. 22.]
482 cord_individual_obj[indivial_i, :] = [ 1.  4. 36. 40.]
483 cord_individual_obj[indivial_i, :] = [ 2.  5. 24. 29.]
484 cord_individual_obj[indivial_i, :] = [ 3.  5. 26. 31.]
485 cord_individual_obj[indivial_i, :] = [ 4.  6. 8. 14.]
486 cord_individual_obj[indivial_i, :] = [ 5.  4. 46. 50.]
487 cord_individual_obj[indivial_i, :] = [ 6.  4. 82. 86.]
488 cord_individual_obj[indivial_i, :] = [ 7.  3. 36. 39.]
489 cord_individual_obj[indivial_i, :] = [ 8.  4. 44. 48.]
490 cord_individual_obj[indivial_i, :] = [ 9.  4. 190. 194.]
491
492 min(cord_individual_obj[:, 3]) = 14.0
493 historl_G_best_iter[iter, 3] = 14.0
494 Begin iteration:
495
496 iter = 29
497 cord_individual_obj[indivial_i, :] = [ 0.  4. 18. 22.]
498 cord_individual_obj[indivial_i, :] = [ 1.  3. 26. 29.]
499 cord_individual_obj[indivial_i, :] = [ 2.  6. 8. 14.]

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500 cord_individual_obj[indivial_i, :] = [ 3. 5. 32. 37.]
501 cord_individual_obj[indivial_i, :] = [ 4. 5. 32. 37.]
502 cord_individual_obj[indivial_i, :] = [ 5. 5. 80. 85.]
503 cord_individual_obj[indivial_i, :] = [ 6. 3. 68. 71.]
504 cord_individual_obj[indivial_i, :] = [ 7. 4. 76. 80.]
505 cord_individual_obj[indivial_i, :] = [ 8. 4. 44. 48.]
506 cord_individual_obj[indivial_i, :] = [ 9. 6. 8. 14.]
507
508 min(cord_individual_obj[:, 3]) = 14.0
509 historl_G_best_iter[iter, 3] = 14.0
510 Begin iteration:
511
512 iter = 30
513 cord_individual_obj[indivial_i, :] = [ 0. 5. 18. 23.]
514 cord_individual_obj[indivial_i, :] = [ 1. 3. 34. 37.]
515 cord_individual_obj[indivial_i, :] = [ 2. 5. 32. 37.]
516 cord_individual_obj[indivial_i, :] = [ 3. 4. 140. 144.]
517 cord_individual_obj[indivial_i, :] = [ 4. 5. 66. 71.]
518 cord_individual_obj[indivial_i, :] = [ 5. 6. 8. 14.]
519 cord_individual_obj[indivial_i, :] = [ 6. 4. 120. 124.]
520 cord_individual_obj[indivial_i, :] = [ 7. 3. 110. 113.]
521 cord_individual_obj[indivial_i, :] = [ 8. 5. 56. 61.]
522 cord_individual_obj[indivial_i, :] = [ 9. 6. 36. 42.]
523
524 min(cord_individual_obj[:, 3]) = 14.0
525 historl_G_best_iter[iter, 3] = 14.0
526 Iteration calculate over
527
528
529
530
531 All item are in Bin and:
532 Bin area = 1080
533 Real_area = 93.0
534 Proportion_of_area = 0.0861111111111111
535 BEST_CHROM =
536     berth: [ 2.5 8. 26. 13.5 17.5 21. ]
537     time: [0. 0. 0. 0. 0. ]
538     num_QC: [4. 4. 2. 3. 3. 2.]
539 Objective function values and some other indicators:
540 Obj0= 6.00          Obj1= 8.00          Obj0 + Obj1 = 14.00
541 Total movement of crane: 8.00
542 Total waiting time in berth position: 0.00
543 Total index of q during berthing: 753.00
544 Specific arrangement for each vessel:
545
      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: 0.0
      gama_i1 + 1: 1.0           work load gap_i: 0           gama_i1 - gama_i0: 0.0           duration_time_i: 1.0           demand_i: 80.0           work load_i:
80.0
546
      V_id: 1           li: 6.0           xi: 8.0           bow of i: 5.0           tail of i: 11.0           gama_i0: 0.0           gama_i1: 1.0
      gama_i1 + 1: 2.0           work load gap_i: 0           gama_i1 - gama_i0: 1.0           duration_time_i: 2.0           demand_i: 120.0           work load_i:
120.0
547
      V_id: 2           li: 6.0           xi: 26.0           bow of i: 23.0           tail of i: 29.0           gama_i0: 0.0           gama_i1: 6
      gama_i1 + 1: 7.0           work load gap_i: 0           gama_i1 - gama_i0: 6.0           duration_time_i: 7.0           demand_i: 260.0           work
load_i: 260.0
548
      V_id: 3           li: 5.0           xi: 13.5           bow of i: 11.0           tail of i: 16.0           gama_i0: 0.0           gama_i1: 1
      gama_i1 + 1: 2.0           work load gap_i: 0           gama_i1 - gama_i0: 1.0           duration_time_i: 2.0           demand_i: 80.0           work
load_i: 80.0
549
      V_id: 4           li: 3.0           xi: 17.5           bow of i: 16.0           tail of i: 19.0           gama_i0: 0.0           gama_i1: 3
      gama_i1 + 1: 4.0           work load gap_i: 0           gama_i1 - gama_i0: 3.0           duration_time_i: 4.0           demand_i: 200.0           work
load_i: 200.0
550
      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           work load gap_i: 0           gama_i1 - gama_i0: 5.0           duration_time_i: 6.0           demand_i: 220.0           work
load_i: 220.0
551
552 Algorithm finished and the total CPU time: 104 s
553 End
554

```