

unknown

```

1 "E:\我的文件\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\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=22527
2
3 import sys; print('Python %s on %s' % (sys.version, sys.platform))
4 sys.path.append(['E:\我的文件\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 = 0.10731234383273802
29   r2 = 0.10731234383273802
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. 104. 107.]
39 cord_individual_obj[individual_i, :] = [ 6.  3. 144. 147.]
40 cord_individual_obj[individual_i, :] = [ 7.  3. 110. 113.]
41 cord_individual_obj[individual_i, :] = [ 8.  3. 112. 115.]
42 cord_individual_obj[individual_i, :] = [ 9.  3. 132. 135.]
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.  5. 72. 77.]
50   cord_individual_obj[individual_i, :] = [ 1.  3. 72. 75.]
51   cord_individual_obj[individual_i, :] = [ 2.  4. 20. 24.]
52   cord_individual_obj[individual_i, :] = [ 3.  5. 18. 23.]
53   cord_individual_obj[individual_i, :] = [ 4.  6. 84. 90.]
54   cord_individual_obj[individual_i, :] = [ 5.  5. 60. 65.]
55   cord_individual_obj[individual_i, :] = [ 6.  6. 48. 54.]
56   cord_individual_obj[individual_i, :] = [ 7.  6. 44. 50.]
57   cord_individual_obj[individual_i, :] = [ 8.  4. 124. 128.]
58   cord_individual_obj[individual_i, :] = [ 9.  6. 32. 38.]
59
60 min(cord_individual_obj[:, 3]) = 23.0
61 historl_G_best_iter[iter, 3] = 23.0
62 Begin iteration:
63
64 iter = 2
65   cord_individual_obj[individual_i, :] = [ 0.  4. 108. 112.]
66   cord_individual_obj[individual_i, :] = [ 1.  5. 54. 59.]
67   cord_individual_obj[individual_i, :] = [ 2.  5. 98. 103.]
68   cord_individual_obj[individual_i, :] = [ 3.  5. 32. 37.]
69   cord_individual_obj[individual_i, :] = [ 4.  5. 18. 23.]
70   cord_individual_obj[individual_i, :] = [ 5.  3. 90. 93.]
71   cord_individual_obj[individual_i, :] = [ 6.  5. 24. 29.]
72   cord_individual_obj[individual_i, :] = [ 7.  5. 38. 43.]
73   cord_individual_obj[individual_i, :] = [ 8.  5. 18. 23.]
74   cord_individual_obj[individual_i, :] = [ 9.  6. 16. 22.]
75
76 min(cord_individual_obj[:, 3]) = 22.0
77 historl_G_best_iter[iter, 3] = 22.0
78 Begin iteration:
79

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80 iter = 3
81 cord_individual_obj[indivial_i, :] = [ 0. 6. 16. 22.]
82 cord_individual_obj[indivial_i, :] = [ 1. 4. 36. 40.]
83 cord_individual_obj[indivial_i, :] = [ 2. 6. 12. 18.]
84 cord_individual_obj[indivial_i, :] = [ 3. 5. 8. 13.]
85 cord_individual_obj[indivial_i, :] = [ 4. 4. 34. 38.]
86 cord_individual_obj[indivial_i, :] = [ 5. 5. 62. 67.]
87 cord_individual_obj[indivial_i, :] = [ 6. 4. 98. 102.]
88 cord_individual_obj[indivial_i, :] = [ 7. 5. 80. 85.]
89 cord_individual_obj[indivial_i, :] = [ 8. 6. 8. 14.]
90 cord_individual_obj[indivial_i, :] = [ 9. 4. 56. 60.]
91
92 min(cord_individual_obj[:, 3]) = 13.0
93 historl_G_best_iter[iter, 3] = 13.0
94 Begin iteration:
95
96 iter = 4
97 cord_individual_obj[indivial_i, :] = [ 0. 5. 56. 61.]
98 cord_individual_obj[indivial_i, :] = [ 1. 3. 72. 75.]
99 cord_individual_obj[indivial_i, :] = [ 2. 6. 112. 118.]
100 cord_individual_obj[indivial_i, :] = [ 3. 5. 72. 77.]
101 cord_individual_obj[indivial_i, :] = [ 4. 5. 52. 57.]
102 cord_individual_obj[indivial_i, :] = [ 5. 3. 102. 105.]
103 cord_individual_obj[indivial_i, :] = [ 6. 5. 8. 13.]
104 cord_individual_obj[indivial_i, :] = [ 7. 5. 32. 37.]
105 cord_individual_obj[indivial_i, :] = [ 8. 4. 52. 56.]
106 cord_individual_obj[indivial_i, :] = [ 9. 6. 54. 60.]
107
108 min(cord_individual_obj[:, 3]) = 13.0
109 historl_G_best_iter[iter, 3] = 13.0
110 Begin iteration:
111
112 iter = 5
113 cord_individual_obj[indivial_i, :] = [ 0. 4. 92. 96.]
114 cord_individual_obj[indivial_i, :] = [ 1. 3. 48. 51.]
115 cord_individual_obj[indivial_i, :] = [ 2. 5. 8. 13.]
116 cord_individual_obj[indivial_i, :] = [ 3. 4. 16. 20.]
117 cord_individual_obj[indivial_i, :] = [ 4. 5. 22. 27.]
118 cord_individual_obj[indivial_i, :] = [ 5. 3. 66. 69.]
119 cord_individual_obj[indivial_i, :] = [ 6. 6. 38. 44.]
120 cord_individual_obj[indivial_i, :] = [ 7. 6. 32. 38.]
121 cord_individual_obj[indivial_i, :] = [ 8. 4. 70. 74.]
122 cord_individual_obj[indivial_i, :] = [ 9. 3. 60. 63.]
123
124 min(cord_individual_obj[:, 3]) = 13.0
125 historl_G_best_iter[iter, 3] = 13.0
126 Begin iteration:
127
128 iter = 6
129 cord_individual_obj[indivial_i, :] = [ 0. 5. 8. 13.]
130 cord_individual_obj[indivial_i, :] = [ 1. 5. 38. 43.]
131 cord_individual_obj[indivial_i, :] = [ 2. 4. 26. 30.]
132 cord_individual_obj[indivial_i, :] = [ 3. 5. 36. 41.]
133 cord_individual_obj[indivial_i, :] = [ 4. 6. 54. 60.]
134 cord_individual_obj[indivial_i, :] = [ 5. 3. 80. 83.]
135 cord_individual_obj[indivial_i, :] = [ 6. 6. 60. 66.]
136 cord_individual_obj[indivial_i, :] = [ 7. 6. 12. 18.]
137 cord_individual_obj[indivial_i, :] = [ 8. 5. 28. 33.]
138 cord_individual_obj[indivial_i, :] = [ 9. 6. 24. 30.]
139
140 min(cord_individual_obj[:, 3]) = 13.0
141 historl_G_best_iter[iter, 3] = 13.0
142 Begin iteration:
143
144 iter = 7
145 cord_individual_obj[indivial_i, :] = [ 0. 5. 30. 35.]
146 cord_individual_obj[indivial_i, :] = [ 1. 5. 108. 113.]
147 cord_individual_obj[indivial_i, :] = [ 2. 4. 26. 30.]
148 cord_individual_obj[indivial_i, :] = [ 3. 3. 96. 99.]
149 cord_individual_obj[indivial_i, :] = [ 4. 6. 64. 70.]
150 cord_individual_obj[indivial_i, :] = [ 5. 5. 8. 13.]
151 cord_individual_obj[indivial_i, :] = [ 6. 6. 20. 26.]
152 cord_individual_obj[indivial_i, :] = [ 7. 6. 32. 38.]
153 cord_individual_obj[indivial_i, :] = [ 8. 5. 28. 33.]
154 cord_individual_obj[indivial_i, :] = [ 9. 3. 24. 27.]
155
156 min(cord_individual_obj[:, 3]) = 13.0
157 historl_G_best_iter[iter, 3] = 13.0
158 Begin iteration:
159
160 iter = 8
161 cord_individual_obj[indivial_i, :] = [ 0. 3. 52. 55.]
162 cord_individual_obj[indivial_i, :] = [ 1. 5. 8. 13.]
163 cord_individual_obj[indivial_i, :] = [ 2. 5. 26. 31.]

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164 cord_individual_obj[indivial_i, :] = [ 3. 3. 104. 107.]
165 cord_individual_obj[indivial_i, :] = [ 4. 6. 80. 86.]
166 cord_individual_obj[indivial_i, :] = [ 5. 3. 80. 83.]
167 cord_individual_obj[indivial_i, :] = [ 6. 6. 38. 44.]
168 cord_individual_obj[indivial_i, :] = [ 7. 6. 20. 26.]
169 cord_individual_obj[indivial_i, :] = [ 8. 5. 28. 33.]
170 cord_individual_obj[indivial_i, :] = [ 9. 6. 52. 58.]
171
172 min(cord_individual_obj[:, 3]) = 13.0
173 historl_G_best_iter[iter, 3] = 13.0
174 Begin iteration:
175
176 iter = 9
177 cord_individual_obj[indivial_i, :] = [ 0. 5. 80. 85.]
178 cord_individual_obj[indivial_i, :] = [ 1. 5. 20. 25.]
179 cord_individual_obj[indivial_i, :] = [ 2. 5. 24. 29.]
180 cord_individual_obj[indivial_i, :] = [ 3. 5. 8. 13.]
181 cord_individual_obj[indivial_i, :] = [ 4. 5. 22. 27.]
182 cord_individual_obj[indivial_i, :] = [ 5. 4. 54. 58.]
183 cord_individual_obj[indivial_i, :] = [ 6. 5. 20. 25.]
184 cord_individual_obj[indivial_i, :] = [ 7. 5. 16. 21.]
185 cord_individual_obj[indivial_i, :] = [ 8. 5. 20. 25.]
186 cord_individual_obj[indivial_i, :] = [ 9. 4. 76. 80.]
187
188 min(cord_individual_obj[:, 3]) = 13.0
189 historl_G_best_iter[iter, 3] = 13.0
190 Begin iteration:
191
192 iter = 10
193 cord_individual_obj[indivial_i, :] = [ 0. 5. 8. 13.]
194 cord_individual_obj[indivial_i, :] = [ 1. 5. 28. 33.]
195 cord_individual_obj[indivial_i, :] = [ 2. 4. 14. 18.]
196 cord_individual_obj[indivial_i, :] = [ 3. 5. 8. 13.]
197 cord_individual_obj[indivial_i, :] = [ 4. 4. 76. 80.]
198 cord_individual_obj[indivial_i, :] = [ 5. 5. 84. 89.]
199 cord_individual_obj[indivial_i, :] = [ 6. 6. 52. 58.]
200 cord_individual_obj[indivial_i, :] = [ 7. 6. 40. 46.]
201 cord_individual_obj[indivial_i, :] = [ 8. 5. 28. 33.]
202 cord_individual_obj[indivial_i, :] = [ 9. 5. 78. 83.]
203
204 min(cord_individual_obj[:, 3]) = 13.0
205 historl_G_best_iter[iter, 3] = 13.0
206 Begin iteration:
207
208 iter = 11
209 cord_individual_obj[indivial_i, :] = [ 0. 4. 30. 34.]
210 cord_individual_obj[indivial_i, :] = [ 1. 5. 38. 43.]
211 cord_individual_obj[indivial_i, :] = [ 2. 4. 116. 120.]
212 cord_individual_obj[indivial_i, :] = [ 3. 3. 18. 21.]
213 cord_individual_obj[indivial_i, :] = [ 4. 6. 90. 96.]
214 cord_individual_obj[indivial_i, :] = [ 5. 5. 8. 13.]
215 cord_individual_obj[indivial_i, :] = [ 6. 6. 60. 66.]
216 cord_individual_obj[indivial_i, :] = [ 7. 6. 12. 18.]
217 cord_individual_obj[indivial_i, :] = [ 8. 5. 24. 29.]
218 cord_individual_obj[indivial_i, :] = [ 9. 6. 44. 50.]
219
220 min(cord_individual_obj[:, 3]) = 13.0
221 historl_G_best_iter[iter, 3] = 13.0
222 Begin iteration:
223
224 iter = 12
225 cord_individual_obj[indivial_i, :] = [ 0. 4. 46. 50.]
226 cord_individual_obj[indivial_i, :] = [ 1. 5. 38. 43.]
227 cord_individual_obj[indivial_i, :] = [ 2. 5. 8. 13.]
228 cord_individual_obj[indivial_i, :] = [ 3. 3. 84. 87.]
229 cord_individual_obj[indivial_i, :] = [ 4. 3. 182. 185.]
230 cord_individual_obj[indivial_i, :] = [ 5. 3. 80. 83.]
231 cord_individual_obj[indivial_i, :] = [ 6. 4. 28. 32.]
232 cord_individual_obj[indivial_i, :] = [ 7. 5. 32. 37.]
233 cord_individual_obj[indivial_i, :] = [ 8. 5. 20. 25.]
234 cord_individual_obj[indivial_i, :] = [ 9. 3. 62. 65.]
235
236 min(cord_individual_obj[:, 3]) = 13.0
237 historl_G_best_iter[iter, 3] = 13.0
238 Begin iteration:
239
240 iter = 13
241 cord_individual_obj[indivial_i, :] = [ 0. 4. 46. 50.]
242 cord_individual_obj[indivial_i, :] = [ 1. 5. 24. 29.]
243 cord_individual_obj[indivial_i, :] = [ 2. 4. 52. 56.]
244 cord_individual_obj[indivial_i, :] = [ 3. 4. 8. 12.]
245 cord_individual_obj[indivial_i, :] = [ 4. 5. 8. 13.]
246 cord_individual_obj[indivial_i, :] = [ 5. 3. 44. 47.]
247 cord_individual_obj[indivial_i, :] = [ 6. 6. 20. 26.]

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248     cord_individual_obj[indivial_i, :] = [ 7. 5. 20. 25.]
249     cord_individual_obj[indivial_i, :] = [ 8. 5. 28. 33.]
250     cord_individual_obj[indivial_i, :] = [ 9. 6. 16. 22.]
251
252 min(cord_individual_obj[:, 3]) = 12.0
253 historl_G_best_iter[iter, 3] = 12.0
254 Begin iteration:
255
256 iter = 14
257     cord_individual_obj[indivial_i, :] = [ 0. 5. 52. 57.]
258     cord_individual_obj[indivial_i, :] = [ 1. 4. 114. 118.]
259     cord_individual_obj[indivial_i, :] = [ 2. 4. 8. 12.]
260     cord_individual_obj[indivial_i, :] = [ 3. 5. 32. 37.]
261     cord_individual_obj[indivial_i, :] = [ 4. 4. 44. 48.]
262     cord_individual_obj[indivial_i, :] = [ 5. 5. 116. 121.]
263     cord_individual_obj[indivial_i, :] = [ 6. 6. 24. 30.]
264     cord_individual_obj[indivial_i, :] = [ 7. 5. 18. 23.]
265     cord_individual_obj[indivial_i, :] = [ 8. 4. 88. 92.]
266     cord_individual_obj[indivial_i, :] = [ 9. 6. 44. 50.]
267
268 min(cord_individual_obj[:, 3]) = 12.0
269 historl_G_best_iter[iter, 3] = 12.0
270 Begin iteration:
271
272 iter = 15
273     cord_individual_obj[indivial_i, :] = [ 0. 3. 102. 105.]
274     cord_individual_obj[indivial_i, :] = [ 1. 4. 60. 64.]
275     cord_individual_obj[indivial_i, :] = [ 2. 4. 32. 36.]
276     cord_individual_obj[indivial_i, :] = [ 3. 4. 32. 36.]
277     cord_individual_obj[indivial_i, :] = [ 4. 6. 12. 18.]
278     cord_individual_obj[indivial_i, :] = [ 5. 4. 8. 12.]
279     cord_individual_obj[indivial_i, :] = [ 6. 6. 24. 30.]
280     cord_individual_obj[indivial_i, :] = [ 7. 6. 12. 18.]
281     cord_individual_obj[indivial_i, :] = [ 8. 3. 38. 41.]
282     cord_individual_obj[indivial_i, :] = [ 9. 5. 36. 41.]
283
284 min(cord_individual_obj[:, 3]) = 12.0
285 historl_G_best_iter[iter, 3] = 12.0
286 Begin iteration:
287
288 iter = 16
289     cord_individual_obj[indivial_i, :] = [ 0. 4. 8. 12.]
290     cord_individual_obj[indivial_i, :] = [ 1. 4. 114. 118.]
291     cord_individual_obj[indivial_i, :] = [ 2. 4. 44. 48.]
292     cord_individual_obj[indivial_i, :] = [ 3. 5. 178. 183.]
293     cord_individual_obj[indivial_i, :] = [ 4. 5. 26. 31.]
294     cord_individual_obj[indivial_i, :] = [ 5. 5. 124. 129.]
295     cord_individual_obj[indivial_i, :] = [ 6. 5. 34. 39.]
296     cord_individual_obj[indivial_i, :] = [ 7. 4. 18. 22.]
297     cord_individual_obj[indivial_i, :] = [ 8. 4. 138. 142.]
298     cord_individual_obj[indivial_i, :] = [ 9. 5. 18. 23.]
299
300 min(cord_individual_obj[:, 3]) = 12.0
301 historl_G_best_iter[iter, 3] = 12.0
302 Begin iteration:
303
304 iter = 17
305     cord_individual_obj[indivial_i, :] = [ 0. 5. 76. 81.]
306     cord_individual_obj[indivial_i, :] = [ 1. 4. 42. 46.]
307     cord_individual_obj[indivial_i, :] = [ 2. 5. 60. 65.]
308     cord_individual_obj[indivial_i, :] = [ 3. 4. 8. 12.]
309     cord_individual_obj[indivial_i, :] = [ 4. 4. 32. 36.]
310     cord_individual_obj[indivial_i, :] = [ 5. 4. 36. 40.]
311     cord_individual_obj[indivial_i, :] = [ 6. 5. 40. 45.]
312     cord_individual_obj[indivial_i, :] = [ 7. 6. 8. 14.]
313     cord_individual_obj[indivial_i, :] = [ 8. 3. 84. 87.]
314     cord_individual_obj[indivial_i, :] = [ 9. 6. 12. 18.]
315
316 min(cord_individual_obj[:, 3]) = 12.0
317 historl_G_best_iter[iter, 3] = 12.0
318 Begin iteration:
319
320 iter = 18
321     cord_individual_obj[indivial_i, :] = [ 0. 3. 136. 139.]
322     cord_individual_obj[indivial_i, :] = [ 1. 4. 144. 148.]
323     cord_individual_obj[indivial_i, :] = [ 2. 5. 48. 53.]
324     cord_individual_obj[indivial_i, :] = [ 3. 5. 54. 59.]
325     cord_individual_obj[indivial_i, :] = [ 4. 6. 44. 50.]
326     cord_individual_obj[indivial_i, :] = [ 5. 3. 52. 55.]
327     cord_individual_obj[indivial_i, :] = [ 6. 6. 24. 30.]
328     cord_individual_obj[indivial_i, :] = [ 7. 6. 40. 46.]
329     cord_individual_obj[indivial_i, :] = [ 8. 4. 8. 12.]
330     cord_individual_obj[indivial_i, :] = [ 9. 5. 12. 17.]
331
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332 min(cord_individual_obj[:, 3]) = 12.0
333 historl_G_best_iter[iter, 3] = 12.0
334 Begin iteration:
335
336 iter = 19
337 cord_individual_obj[indivial_i, :] = [ 0.  5. 86. 91.]
338 cord_individual_obj[indivial_i, :] = [ 1.  4. 8. 12.]
339 cord_individual_obj[indivial_i, :] = [ 2.  5. 44. 49.]
340 cord_individual_obj[indivial_i, :] = [ 3.  5. 166. 171.]
341 cord_individual_obj[indivial_i, :] = [ 4.  6. 8. 14.]
342 cord_individual_obj[indivial_i, :] = [ 5.  5. 124. 129.]
343 cord_individual_obj[indivial_i, :] = [ 6.  6. 12. 18.]
344 cord_individual_obj[indivial_i, :] = [ 7.  5. 18. 23.]
345 cord_individual_obj[indivial_i, :] = [ 8.  4. 138. 142.]
346 cord_individual_obj[indivial_i, :] = [ 9.  6. 24. 30.]
347
348 min(cord_individual_obj[:, 3]) = 12.0
349 historl_G_best_iter[iter, 3] = 12.0
350 Begin iteration:
351
352 iter = 20
353 cord_individual_obj[indivial_i, :] = [ 0.  5. 116. 121.]
354 cord_individual_obj[indivial_i, :] = [ 1.  4. 70. 74.]
355 cord_individual_obj[indivial_i, :] = [ 2.  5. 44. 49.]
356 cord_individual_obj[indivial_i, :] = [ 3.  4. 8. 12.]
357 cord_individual_obj[indivial_i, :] = [ 4.  5. 76. 81.]
358 cord_individual_obj[indivial_i, :] = [ 5.  5. 76. 81.]
359 cord_individual_obj[indivial_i, :] = [ 6.  4. 106. 110.]
360 cord_individual_obj[indivial_i, :] = [ 7.  6. 52. 58.]
361 cord_individual_obj[indivial_i, :] = [ 8.  3. 84. 87.]
362 cord_individual_obj[indivial_i, :] = [ 9.  5. 64. 69.]
363
364 min(cord_individual_obj[:, 3]) = 12.0
365 historl_G_best_iter[iter, 3] = 12.0
366 Begin iteration:
367
368 iter = 21
369 cord_individual_obj[indivial_i, :] = [ 0.  4. 8. 12.]
370 cord_individual_obj[indivial_i, :] = [ 1.  4. 136. 140.]
371 cord_individual_obj[indivial_i, :] = [ 2.  5. 52. 57.]
372 cord_individual_obj[indivial_i, :] = [ 3.  5. 178. 183.]
373 cord_individual_obj[indivial_i, :] = [ 4.  4. 46. 50.]
374 cord_individual_obj[indivial_i, :] = [ 5.  3. 100. 103.]
375 cord_individual_obj[indivial_i, :] = [ 6.  4. 34. 38.]
376 cord_individual_obj[indivial_i, :] = [ 7.  6. 8. 14.]
377 cord_individual_obj[indivial_i, :] = [ 8.  4. 110. 114.]
378 cord_individual_obj[indivial_i, :] = [ 9.  4. 48. 52.]
379
380 min(cord_individual_obj[:, 3]) = 12.0
381 historl_G_best_iter[iter, 3] = 12.0
382 Begin iteration:
383
384 iter = 22
385 cord_individual_obj[indivial_i, :] = [ 0.  5. 76. 81.]
386 cord_individual_obj[indivial_i, :] = [ 1.  4. 110. 114.]
387 cord_individual_obj[indivial_i, :] = [ 2.  4. 18. 22.]
388 cord_individual_obj[indivial_i, :] = [ 3.  4. 8. 12.]
389 cord_individual_obj[indivial_i, :] = [ 4.  6. 128. 134.]
390 cord_individual_obj[indivial_i, :] = [ 5.  4. 16. 20.]
391 cord_individual_obj[indivial_i, :] = [ 6.  4. 148. 152.]
392 cord_individual_obj[indivial_i, :] = [ 7.  6. 90. 96.]
393 cord_individual_obj[indivial_i, :] = [ 8.  3. 56. 59.]
394 cord_individual_obj[indivial_i, :] = [ 9.  6. 20. 26.]
395
396 min(cord_individual_obj[:, 3]) = 12.0
397 historl_G_best_iter[iter, 3] = 12.0
398 Begin iteration:
399
400 iter = 23
401 cord_individual_obj[indivial_i, :] = [ 0.  5. 76. 81.]
402 cord_individual_obj[indivial_i, :] = [ 1.  4. 146. 150.]
403 cord_individual_obj[indivial_i, :] = [ 2.  4. 52. 56.]
404 cord_individual_obj[indivial_i, :] = [ 3.  5. 130. 135.]
405 cord_individual_obj[indivial_i, :] = [ 4.  5. 56. 61.]
406 cord_individual_obj[indivial_i, :] = [ 5.  5. 124. 129.]
407 cord_individual_obj[indivial_i, :] = [ 6.  4. 8. 12.]
408 cord_individual_obj[indivial_i, :] = [ 7.  4. 18. 22.]
409 cord_individual_obj[indivial_i, :] = [ 8.  4. 138. 142.]
410 cord_individual_obj[indivial_i, :] = [ 9.  5. 18. 23.]
411
412 min(cord_individual_obj[:, 3]) = 12.0
413 historl_G_best_iter[iter, 3] = 12.0
414 Begin iteration:
415

```

```

416 iter = 24
417 cord_individual_obj[indivial_i, :] = [ 0.  3. 136. 139.]
418 cord_individual_obj[indivial_i, :] = [ 1.  4.  8. 12.]
419 cord_individual_obj[indivial_i, :] = [ 2.  5. 48. 53.]
420 cord_individual_obj[indivial_i, :] = [ 3.  5. 36. 41.]
421 cord_individual_obj[indivial_i, :] = [ 4.  4. 64. 68.]
422 cord_individual_obj[indivial_i, :] = [ 5.  3. 76. 79.]
423 cord_individual_obj[indivial_i, :] = [ 6.  5. 26. 31.]
424 cord_individual_obj[indivial_i, :] = [ 7.  6. 58. 64.]
425 cord_individual_obj[indivial_i, :] = [ 8.  4. 78. 82.]
426 cord_individual_obj[indivial_i, :] = [ 9.  5. 68. 73.]
427
428 min(cord_individual_obj[:, 3]) = 12.0
429 historl_G_best_iter[iter, 3] = 12.0
430 Begin iteration:
431
432 iter = 25
433 cord_individual_obj[indivial_i, :] = [ 0.  4.  8. 12.]
434 cord_individual_obj[indivial_i, :] = [ 1.  4. 76. 80.]
435 cord_individual_obj[indivial_i, :] = [ 2.  5. 44. 49.]
436 cord_individual_obj[indivial_i, :] = [ 3.  5. 180. 185.]
437 cord_individual_obj[indivial_i, :] = [ 4.  5. 36. 41.]
438 cord_individual_obj[indivial_i, :] = [ 5.  5. 124. 129.]
439 cord_individual_obj[indivial_i, :] = [ 6.  6. 24. 30.]
440 cord_individual_obj[indivial_i, :] = [ 7.  5. 18. 23.]
441 cord_individual_obj[indivial_i, :] = [ 8.  3. 54. 57.]
442 cord_individual_obj[indivial_i, :] = [ 9.  6. 14. 20.]
443
444 min(cord_individual_obj[:, 3]) = 12.0
445 historl_G_best_iter[iter, 3] = 12.0
446 Begin iteration:
447
448 iter = 26
449 cord_individual_obj[indivial_i, :] = [ 0.  5. 92. 97.]
450 cord_individual_obj[indivial_i, :] = [ 1.  4. 90. 94.]
451 cord_individual_obj[indivial_i, :] = [ 2.  4. 44. 48.]
452 cord_individual_obj[indivial_i, :] = [ 3.  4. 8. 12.]
453 cord_individual_obj[indivial_i, :] = [ 4.  4. 156. 160.]
454 cord_individual_obj[indivial_i, :] = [ 5.  5. 76. 81.]
455 cord_individual_obj[indivial_i, :] = [ 6.  4. 78. 82.]
456 cord_individual_obj[indivial_i, :] = [ 7.  6. 18. 24.]
457 cord_individual_obj[indivial_i, :] = [ 8.  3. 70. 73.]
458 cord_individual_obj[indivial_i, :] = [ 9.  3. 108. 111.]
459
460 min(cord_individual_obj[:, 3]) = 12.0
461 historl_G_best_iter[iter, 3] = 12.0
462 Begin iteration:
463
464 iter = 27
465 cord_individual_obj[indivial_i, :] = [ 0.  5. 98. 103.]
466 cord_individual_obj[indivial_i, :] = [ 1.  4. 70. 74.]
467 cord_individual_obj[indivial_i, :] = [ 2.  5. 64. 69.]
468 cord_individual_obj[indivial_i, :] = [ 3.  5. 32. 37.]
469 cord_individual_obj[indivial_i, :] = [ 4.  4. 8. 12.]
470 cord_individual_obj[indivial_i, :] = [ 5.  3. 132. 135.]
471 cord_individual_obj[indivial_i, :] = [ 6.  6. 12. 18.]
472 cord_individual_obj[indivial_i, :] = [ 7.  6. 8. 14.]
473 cord_individual_obj[indivial_i, :] = [ 8.  4. 32. 36.]
474 cord_individual_obj[indivial_i, :] = [ 9.  5. 22. 27.]
475
476 min(cord_individual_obj[:, 3]) = 12.0
477 historl_G_best_iter[iter, 3] = 12.0
478 Begin iteration:
479
480 iter = 28
481 cord_individual_obj[indivial_i, :] = [ 0.  5. 82. 87.]
482 cord_individual_obj[indivial_i, :] = [ 1.  4. 114. 118.]
483 cord_individual_obj[indivial_i, :] = [ 2.  5. 44. 49.]
484 cord_individual_obj[indivial_i, :] = [ 3.  5. 70. 75.]
485 cord_individual_obj[indivial_i, :] = [ 4.  5. 36. 41.]
486 cord_individual_obj[indivial_i, :] = [ 5.  4. 8. 12.]
487 cord_individual_obj[indivial_i, :] = [ 6.  6. 36. 42.]
488 cord_individual_obj[indivial_i, :] = [ 7.  4. 44. 48.]
489 cord_individual_obj[indivial_i, :] = [ 8.  3. 70. 73.]
490 cord_individual_obj[indivial_i, :] = [ 9.  6. 20. 26.]
491
492 min(cord_individual_obj[:, 3]) = 12.0
493 historl_G_best_iter[iter, 3] = 12.0
494 Begin iteration:
495
496 iter = 29
497 cord_individual_obj[indivial_i, :] = [ 0.  4. 98. 102.]
498 cord_individual_obj[indivial_i, :] = [ 1.  4. 8. 12.]
499 cord_individual_obj[indivial_i, :] = [ 2.  4. 70. 74.]

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unknown

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500 cord_individual_obj[indivial_i,:] = [ 3. 3. 32. 35.]
501 cord_individual_obj[indivial_i,:] = [ 4. 6. 12. 18.]
502 cord_individual_obj[indivial_i,:] = [ 5. 5. 124. 129.]
503 cord_individual_obj[indivial_i,:] = [ 6. 4. 114. 118.]
504 cord_individual_obj[indivial_i,:] = [ 7. 6. 12. 18.]
505 cord_individual_obj[indivial_i,:] = [ 8. 3. 32. 35.]
506 cord_individual_obj[indivial_i,:] = [ 9. 5. 64. 69.]
507
508 min(cord_individual_obj[:, 3]) = 12.0
509 historl_G_best_iter[iter, 3] = 12.0
510 Begin iteration:
511
512 iter = 30
513 cord_individual_obj[indivial_i,:] = [ 0. 5. 86. 91.]
514 cord_individual_obj[indivial_i,:] = [ 1. 4. 146. 150.]
515 cord_individual_obj[indivial_i,:] = [ 2. 4. 44. 48.]
516 cord_individual_obj[indivial_i,:] = [ 3. 5. 126. 131.]
517 cord_individual_obj[indivial_i,:] = [ 4. 6. 12. 18.]
518 cord_individual_obj[indivial_i,:] = [ 5. 4. 8. 12.]
519 cord_individual_obj[indivial_i,:] = [ 6. 5. 34. 39.]
520 cord_individual_obj[indivial_i,:] = [ 7. 4. 44. 48.]
521 cord_individual_obj[indivial_i,:] = [ 8. 3. 70. 73.]
522 cord_individual_obj[indivial_i,:] = [ 9. 5. 22. 27.]
523
524 min(cord_individual_obj[:, 3]) = 12.0
525 historl_G_best_iter[iter, 3] = 12.0
526 Iteration calculate over
527
528
529
530
531 All item are in Bin and:
532 Bin area = 1080
533 Real_area = 104.0
534 Proportion_of_area = 0.0962962962962963
535 BEST_CHROM =
536     berth: [15.5 26. 3. 20.5 7.5 11. ]
537     time: [0. 0. 0. 0. 0.]
538     num_QC: [4. 2. 5. 2. 2. 4.]
539 Objective function values and some other indicators:
540 Obj0=4.00          Obj1=8.00          Obj0 + Obj1 = 12.00
541 Total movement of crane: 8.00
542 Total waiting time in berth position: 0.00
543 Total index of q during berthing: 463.00
544 Specific arrangement for each vessel:
545
      V_id: 0           li: 5.0           xi: 15.5           bow of i: 13.0           tail of i: 18.0           gama_i0: 0.0           gama_i1: 0
      .0                 gama_i1 + 1: 1.0           gama_i1 - gama_i0: 0.0           duration_time_i: 1.0           demand_i: 80.0           work
      load_i: 80.0       work load gap_i: 0
546
      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
      .0                 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
547
      V_id: 2           li: 6.0           xi: 3.0            bow of i: 0.0           tail of i: 6.0           gama_i0: 0.0           gama_i1: 2.0
      260.0             gama_i1 + 1: 3.0           gama_i1 - gama_i0: 2.0           duration_time_i: 3.0           demand_i: 260.0           work load_i:
      work load gap_i: 0
548
      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
      .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
549
      V_id: 4           li: 3.0           xi: 7.5            bow of i: 6.0           tail of i: 9.0           gama_i0: 0.0           gama_i1: 4.0
      200.0             gama_i1 + 1: 5.0           gama_i1 - gama_i0: 4.0           duration_time_i: 5.0           demand_i: 200.0           work load_i:
      work load gap_i: 0
550
      V_id: 5           li: 4.0           xi: 11.0           bow of i: 9.0           tail of i: 13.0           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
551
552 Algorithm finished and the total CPU time: 113 s
553 End
554
```