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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=54831
2
3 import sys; print('Python %s on %s' % (sys.version, sys.platform))
4 sys.path.append(['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 = 19
23   maxIter_num = 30
24   W_inertia = 0.5
25   oder_type_num = 10
26   c1 = 2.5
27   c2 = 2.5
28   r1 = 0.9791145748296551
29   r2 = 0.9791145748296551
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. 106. 109.]
39   cord_individual_obj[individual_i, :] = [ 6.  3. 78. 81.]
40   cord_individual_obj[individual_i, :] = [ 7.  3. 108. 111.]
41   cord_individual_obj[individual_i, :] = [ 8.  3. 130. 133.]
42   cord_individual_obj[individual_i, :] = [ 9.  3. 80. 83.]
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. 84. 88.]
50   cord_individual_obj[individual_i, :] = [ 1.  3. 72. 75.]
51   cord_individual_obj[individual_i, :] = [ 2.  4. 74. 78.]
52   cord_individual_obj[individual_i, :] = [ 3.  4. 36. 40.]
53   cord_individual_obj[individual_i, :] = [ 4.  4. 94. 98.]
54   cord_individual_obj[individual_i, :] = [ 5.  3. 58. 61.]
55   cord_individual_obj[individual_i, :] = [ 6.  4. 106. 110.]
56   cord_individual_obj[individual_i, :] = [ 7.  4. 48. 52.]
57   cord_individual_obj[individual_i, :] = [ 8.  4. 56. 60.]
58   cord_individual_obj[individual_i, :] = [ 9.  3. 100. 103.]
59
60 min(cord_individual_obj[:, 3]) = 40.0
61 historl_G_best_iter[iter, 3] = 40.0
62 Begin iteration:
63
64 iter = 2
65   cord_individual_obj[individual_i, :] = [ 0.  4. 46. 50.]
66   cord_individual_obj[individual_i, :] = [ 1.  4. 26. 30.]
67   cord_individual_obj[individual_i, :] = [ 2.  4. 42. 46.]
68   cord_individual_obj[individual_i, :] = [ 3.  4. 64. 68.]
69   cord_individual_obj[individual_i, :] = [ 4.  4. 80. 84.]
70   cord_individual_obj[individual_i, :] = [ 5.  4. 80. 84.]
71   cord_individual_obj[individual_i, :] = [ 6.  4. 36. 40.]
72   cord_individual_obj[individual_i, :] = [ 7.  4. 64. 68.]
73   cord_individual_obj[individual_i, :] = [ 8.  4. 26. 30.]
74   cord_individual_obj[individual_i, :] = [ 9.  4. 54. 58.]
75
76 min(cord_individual_obj[:, 3]) = 30.0
77 historl_G_best_iter[iter, 3] = 30.0
78 Begin iteration:
79

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80 iter = 3
81 cord_individual_obj[indivial_i, :] = [ 0. 5. 24. 29.]
82 cord_individual_obj[indivial_i, :] = [ 1. 5. 36. 41.]
83 cord_individual_obj[indivial_i, :] = [ 2. 5. 28. 33.]
84 cord_individual_obj[indivial_i, :] = [ 3. 5. 34. 39.]
85 cord_individual_obj[indivial_i, :] = [ 4. 4. 26. 30.]
86 cord_individual_obj[indivial_i, :] = [ 5. 5. 18. 23.]
87 cord_individual_obj[indivial_i, :] = [ 6. 5. 66. 71.]
88 cord_individual_obj[indivial_i, :] = [ 7. 5. 52. 57.]
89 cord_individual_obj[indivial_i, :] = [ 8. 5. 48. 53.]
90 cord_individual_obj[indivial_i, :] = [ 9. 5. 18. 23.]
91
92 min(cord_individual_obj[:, 3]) = 23.0
93 historl_G_best_iter[iter, 3] = 23.0
94 Begin iteration:
95
96 iter = 4
97 cord_individual_obj[indivial_i, :] = [ 0. 5. 44. 49.]
98 cord_individual_obj[indivial_i, :] = [ 1. 4. 50. 54.]
99 cord_individual_obj[indivial_i, :] = [ 2. 5. 22. 27.]
100 cord_individual_obj[indivial_i, :] = [ 3. 5. 36. 41.]
101 cord_individual_obj[indivial_i, :] = [ 4. 5. 44. 49.]
102 cord_individual_obj[indivial_i, :] = [ 5. 5. 36. 41.]
103 cord_individual_obj[indivial_i, :] = [ 6. 5. 18. 23.]
104 cord_individual_obj[indivial_i, :] = [ 7. 5. 36. 41.]
105 cord_individual_obj[indivial_i, :] = [ 8. 4. 24. 28.]
106 cord_individual_obj[indivial_i, :] = [ 9. 4. 64. 68.]
107
108 min(cord_individual_obj[:, 3]) = 23.0
109 historl_G_best_iter[iter, 3] = 23.0
110 Begin iteration:
111
112 iter = 5
113 cord_individual_obj[indivial_i, :] = [ 0. 5. 36. 41.]
114 cord_individual_obj[indivial_i, :] = [ 1. 5. 8. 13.]
115 cord_individual_obj[indivial_i, :] = [ 2. 5. 8. 13.]
116 cord_individual_obj[indivial_i, :] = [ 3. 5. 52. 57.]
117 cord_individual_obj[indivial_i, :] = [ 4. 5. 20. 25.]
118 cord_individual_obj[indivial_i, :] = [ 5. 5. 12. 17.]
119 cord_individual_obj[indivial_i, :] = [ 6. 4. 32. 36.]
120 cord_individual_obj[indivial_i, :] = [ 7. 5. 40. 45.]
121 cord_individual_obj[indivial_i, :] = [ 8. 5. 36. 41.]
122 cord_individual_obj[indivial_i, :] = [ 9. 5. 18. 23.]
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. 20. 25.]
130 cord_individual_obj[indivial_i, :] = [ 1. 4. 66. 70.]
131 cord_individual_obj[indivial_i, :] = [ 2. 5. 18. 23.]
132 cord_individual_obj[indivial_i, :] = [ 3. 5. 8. 13.]
133 cord_individual_obj[indivial_i, :] = [ 4. 3. 20. 23.]
134 cord_individual_obj[indivial_i, :] = [ 5. 5. 30. 35.]
135 cord_individual_obj[indivial_i, :] = [ 6. 4. 18. 22.]
136 cord_individual_obj[indivial_i, :] = [ 7. 5. 36. 41.]
137 cord_individual_obj[indivial_i, :] = [ 8. 3. 20. 23.]
138 cord_individual_obj[indivial_i, :] = [ 9. 5. 18. 23.]
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. 22. 27.]
146 cord_individual_obj[indivial_i, :] = [ 1. 5. 8. 13.]
147 cord_individual_obj[indivial_i, :] = [ 2. 5. 8. 13.]
148 cord_individual_obj[indivial_i, :] = [ 3. 5. 12. 17.]
149 cord_individual_obj[indivial_i, :] = [ 4. 4. 50. 54.]
150 cord_individual_obj[indivial_i, :] = [ 5. 5. 36. 41.]
151 cord_individual_obj[indivial_i, :] = [ 6. 4. 26. 30.]
152 cord_individual_obj[indivial_i, :] = [ 7. 5. 18. 23.]
153 cord_individual_obj[indivial_i, :] = [ 8. 4. 90. 94.]
154 cord_individual_obj[indivial_i, :] = [ 9. 4. 60. 64.]
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. 5. 18. 23.]
162 cord_individual_obj[indivial_i, :] = [ 1. 4. 66. 70.]
163 cord_individual_obj[indivial_i, :] = [ 2. 5. 18. 23.]
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164 cord_individual_obj[indivial_i, :] = [ 3. 5. 28. 33.]
165 cord_individual_obj[indivial_i, :] = [ 4. 3. 20. 23.]
166 cord_individual_obj[indivial_i, :] = [ 5. 5. 12. 17.]
167 cord_individual_obj[indivial_i, :] = [ 6. 5. 12. 17.]
168 cord_individual_obj[indivial_i, :] = [ 7. 5. 48. 53.]
169 cord_individual_obj[indivial_i, :] = [ 8. 5. 8. 13.]
170 cord_individual_obj[indivial_i, :] = [ 9. 5. 18. 23.]
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. 18. 23.]
178 cord_individual_obj[indivial_i, :] = [ 1. 5. 8. 13.]
179 cord_individual_obj[indivial_i, :] = [ 2. 5. 20. 25.]
180 cord_individual_obj[indivial_i, :] = [ 3. 5. 70. 75.]
181 cord_individual_obj[indivial_i, :] = [ 4. 5. 18. 23.]
182 cord_individual_obj[indivial_i, :] = [ 5. 5. 18. 23.]
183 cord_individual_obj[indivial_i, :] = [ 6. 5. 20. 25.]
184 cord_individual_obj[indivial_i, :] = [ 7. 5. 70. 75.]
185 cord_individual_obj[indivial_i, :] = [ 8. 4. 12. 16.]
186 cord_individual_obj[indivial_i, :] = [ 9. 4. 20. 24.]
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. 20. 25.]
194 cord_individual_obj[indivial_i, :] = [ 1. 4. 66. 70.]
195 cord_individual_obj[indivial_i, :] = [ 2. 5. 18. 23.]
196 cord_individual_obj[indivial_i, :] = [ 3. 5. 8. 13.]
197 cord_individual_obj[indivial_i, :] = [ 4. 4. 18. 22.]
198 cord_individual_obj[indivial_i, :] = [ 5. 5. 12. 17.]
199 cord_individual_obj[indivial_i, :] = [ 6. 4. 18. 22.]
200 cord_individual_obj[indivial_i, :] = [ 7. 5. 48. 53.]
201 cord_individual_obj[indivial_i, :] = [ 8. 5. 58. 63.]
202 cord_individual_obj[indivial_i, :] = [ 9. 4. 18. 22.]
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. 5. 20. 25.]
210 cord_individual_obj[indivial_i, :] = [ 1. 5. 8. 13.]
211 cord_individual_obj[indivial_i, :] = [ 2. 5. 18. 23.]
212 cord_individual_obj[indivial_i, :] = [ 3. 5. 12. 17.]
213 cord_individual_obj[indivial_i, :] = [ 4. 5. 18. 23.]
214 cord_individual_obj[indivial_i, :] = [ 5. 5. 12. 17.]
215 cord_individual_obj[indivial_i, :] = [ 6. 5. 18. 23.]
216 cord_individual_obj[indivial_i, :] = [ 7. 5. 12. 17.]
217 cord_individual_obj[indivial_i, :] = [ 8. 5. 18. 23.]
218 cord_individual_obj[indivial_i, :] = [ 9. 4. 18. 22.]
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. 5. 8. 13.]
226 cord_individual_obj[indivial_i, :] = [ 1. 5. 36. 41.]
227 cord_individual_obj[indivial_i, :] = [ 2. 5. 18. 23.]
228 cord_individual_obj[indivial_i, :] = [ 3. 5. 12. 17.]
229 cord_individual_obj[indivial_i, :] = [ 4. 3. 18. 21.]
230 cord_individual_obj[indivial_i, :] = [ 5. 5. 12. 17.]
231 cord_individual_obj[indivial_i, :] = [ 6. 4. 18. 22.]
232 cord_individual_obj[indivial_i, :] = [ 7. 5. 28. 33.]
233 cord_individual_obj[indivial_i, :] = [ 8. 5. 58. 63.]
234 cord_individual_obj[indivial_i, :] = [ 9. 4. 18. 22.]
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. 5. 18. 23.]
242 cord_individual_obj[indivial_i, :] = [ 1. 4. 18. 22.]
243 cord_individual_obj[indivial_i, :] = [ 2. 5. 18. 23.]
244 cord_individual_obj[indivial_i, :] = [ 3. 5. 28. 33.]
245 cord_individual_obj[indivial_i, :] = [ 4. 4. 18. 22.]
246 cord_individual_obj[indivial_i, :] = [ 5. 5. 12. 17.]
247 cord_individual_obj[indivial_i, :] = [ 6. 5. 18. 23.]

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248     cord_individual_obj[indivial_i, :] = [ 7. 5. 12. 17.]
249     cord_individual_obj[indivial_i, :] = [ 8. 5. 8. 13.]
250     cord_individual_obj[indivial_i, :] = [ 9. 4. 18. 22.]
251
252     min(cord_individual_obj[:, 3]) = 13.0
253     historl_G_best_iter[iter, 3] = 13.0
254 Begin iteration:
255
256 iter = 14
257     cord_individual_obj[indivial_i, :] = [ 0. 5. 36. 41.]
258     cord_individual_obj[indivial_i, :] = [ 1. 5. 70. 75.]
259     cord_individual_obj[indivial_i, :] = [ 2. 5. 20. 25.]
260     cord_individual_obj[indivial_i, :] = [ 3. 5. 8. 13.]
261     cord_individual_obj[indivial_i, :] = [ 4. 3. 20. 23.]
262     cord_individual_obj[indivial_i, :] = [ 5. 5. 28. 33.]
263     cord_individual_obj[indivial_i, :] = [ 6. 5. 20. 25.]
264     cord_individual_obj[indivial_i, :] = [ 7. 5. 112. 117.]
265     cord_individual_obj[indivial_i, :] = [ 8. 4. 12. 16.]
266     cord_individual_obj[indivial_i, :] = [ 9. 4. 20. 24.]
267
268     min(cord_individual_obj[:, 3]) = 13.0
269     historl_G_best_iter[iter, 3] = 13.0
270 Begin iteration:
271
272 iter = 15
273     cord_individual_obj[indivial_i, :] = [ 0. 5. 40. 45.]
274     cord_individual_obj[indivial_i, :] = [ 1. 5. 48. 53.]
275     cord_individual_obj[indivial_i, :] = [ 2. 5. 8. 13.]
276     cord_individual_obj[indivial_i, :] = [ 3. 5. 48. 53.]
277     cord_individual_obj[indivial_i, :] = [ 4. 4. 32. 36.]
278     cord_individual_obj[indivial_i, :] = [ 5. 5. 40. 45.]
279     cord_individual_obj[indivial_i, :] = [ 6. 4. 8. 12.]
280     cord_individual_obj[indivial_i, :] = [ 7. 5. 8. 13.]
281     cord_individual_obj[indivial_i, :] = [ 8. 6. 8. 14.]
282     cord_individual_obj[indivial_i, :] = [ 9. 4. 8. 12.]
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. 5. 12. 17.]
290     cord_individual_obj[indivial_i, :] = [ 1. 4. 8. 12.]
291     cord_individual_obj[indivial_i, :] = [ 2. 6. 12. 18.]
292     cord_individual_obj[indivial_i, :] = [ 3. 4. 12. 16.]
293     cord_individual_obj[indivial_i, :] = [ 4. 5. 12. 17.]
294     cord_individual_obj[indivial_i, :] = [ 5. 5. 12. 17.]
295     cord_individual_obj[indivial_i, :] = [ 6. 6. 12. 18.]
296     cord_individual_obj[indivial_i, :] = [ 7. 4. 12. 16.]
297     cord_individual_obj[indivial_i, :] = [ 8. 6. 12. 18.]
298     cord_individual_obj[indivial_i, :] = [ 9. 5. 12. 17.]
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. 12. 17.]
306     cord_individual_obj[indivial_i, :] = [ 1. 5. 30. 35.]
307     cord_individual_obj[indivial_i, :] = [ 2. 4. 8. 12.]
308     cord_individual_obj[indivial_i, :] = [ 3. 4. 52. 56.]
309     cord_individual_obj[indivial_i, :] = [ 4. 5. 18. 23.]
310     cord_individual_obj[indivial_i, :] = [ 5. 5. 12. 17.]
311     cord_individual_obj[indivial_i, :] = [ 6. 6. 12. 18.]
312     cord_individual_obj[indivial_i, :] = [ 7. 6. 24. 30.]
313     cord_individual_obj[indivial_i, :] = [ 8. 6. 74. 80.]
314     cord_individual_obj[indivial_i, :] = [ 9. 5. 12. 17.]
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. 4. 12. 16.]
322     cord_individual_obj[indivial_i, :] = [ 1. 4. 18. 22.]
323     cord_individual_obj[indivial_i, :] = [ 2. 6. 12. 18.]
324     cord_individual_obj[indivial_i, :] = [ 3. 4. 28. 32.]
325     cord_individual_obj[indivial_i, :] = [ 4. 4. 12. 16.]
326     cord_individual_obj[indivial_i, :] = [ 5. 4. 12. 16.]
327     cord_individual_obj[indivial_i, :] = [ 6. 4. 12. 16.]
328     cord_individual_obj[indivial_i, :] = [ 7. 4. 12. 16.]
329     cord_individual_obj[indivial_i, :] = [ 8. 4. 8. 12.]
330     cord_individual_obj[indivial_i, :] = [ 9. 4. 12. 16.]
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.  4. 18. 22.]
338 cord_individual_obj[indivial_i, :] = [ 1.  5. 66. 71.]
339 cord_individual_obj[indivial_i, :] = [ 2.  4. 18. 22.]
340 cord_individual_obj[indivial_i, :] = [ 3.  4.  8. 12.]
341 cord_individual_obj[indivial_i, :] = [ 4.  5. 18. 23.]
342 cord_individual_obj[indivial_i, :] = [ 5.  4. 12. 16.]
343 cord_individual_obj[indivial_i, :] = [ 6.  6. 18. 24.]
344 cord_individual_obj[indivial_i, :] = [ 7.  6. 48. 54.]
345 cord_individual_obj[indivial_i, :] = [ 8.  6. 50. 56.]
346 cord_individual_obj[indivial_i, :] = [ 9.  5. 18. 23.]
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.  4. 18. 22.]
354 cord_individual_obj[indivial_i, :] = [ 1.  4.  8. 12.]
355 cord_individual_obj[indivial_i, :] = [ 2.  6. 18. 24.]
356 cord_individual_obj[indivial_i, :] = [ 3.  4. 52. 56.]
357 cord_individual_obj[indivial_i, :] = [ 4.  4. 18. 22.]
358 cord_individual_obj[indivial_i, :] = [ 5.  4. 18. 22.]
359 cord_individual_obj[indivial_i, :] = [ 6.  4. 18. 22.]
360 cord_individual_obj[indivial_i, :] = [ 7.  4. 40. 44.]
361 cord_individual_obj[indivial_i, :] = [ 8.  4. 34. 38.]
362 cord_individual_obj[indivial_i, :] = [ 9.  4. 18. 22.]
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. 12. 16.]
370 cord_individual_obj[indivial_i, :] = [ 1.  5. 30. 35.]
371 cord_individual_obj[indivial_i, :] = [ 2.  4. 12. 16.]
372 cord_individual_obj[indivial_i, :] = [ 3.  4.  8. 12.]
373 cord_individual_obj[indivial_i, :] = [ 4.  5. 12. 17.]
374 cord_individual_obj[indivial_i, :] = [ 5.  4. 12. 16.]
375 cord_individual_obj[indivial_i, :] = [ 6.  6. 12. 18.]
376 cord_individual_obj[indivial_i, :] = [ 7.  6. 12. 18.]
377 cord_individual_obj[indivial_i, :] = [ 8.  6. 12. 18.]
378 cord_individual_obj[indivial_i, :] = [ 9.  5. 12. 17.]
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.  4. 18. 22.]
386 cord_individual_obj[indivial_i, :] = [ 1.  4.  8. 12.]
387 cord_individual_obj[indivial_i, :] = [ 2.  6. 18. 24.]
388 cord_individual_obj[indivial_i, :] = [ 3.  4. 12. 16.]
389 cord_individual_obj[indivial_i, :] = [ 4.  4. 12. 16.]
390 cord_individual_obj[indivial_i, :] = [ 5.  4. 18. 22.]
391 cord_individual_obj[indivial_i, :] = [ 6.  4. 18. 22.]
392 cord_individual_obj[indivial_i, :] = [ 7.  4. 58. 62.]
393 cord_individual_obj[indivial_i, :] = [ 8.  4. 12. 16.]
394 cord_individual_obj[indivial_i, :] = [ 9.  4. 18. 22.]
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.  4. 26. 30.]
402 cord_individual_obj[indivial_i, :] = [ 1.  5. 52. 57.]
403 cord_individual_obj[indivial_i, :] = [ 2.  4. 38. 42.]
404 cord_individual_obj[indivial_i, :] = [ 3.  4. 18. 22.]
405 cord_individual_obj[indivial_i, :] = [ 4.  5. 18. 23.]
406 cord_individual_obj[indivial_i, :] = [ 5.  4. 12. 16.]
407 cord_individual_obj[indivial_i, :] = [ 6.  6.  8. 14.]
408 cord_individual_obj[indivial_i, :] = [ 7.  4.  8. 12.]
409 cord_individual_obj[indivial_i, :] = [ 8.  6.  8. 14.]
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. 4. 12. 16.]
418 cord_individual_obj[indivial_i, :] = [ 1. 4. 8. 12.]
419 cord_individual_obj[indivial_i, :] = [ 2. 6. 12. 18.]
420 cord_individual_obj[indivial_i, :] = [ 3. 4. 12. 16.]
421 cord_individual_obj[indivial_i, :] = [ 4. 4. 18. 22.]
422 cord_individual_obj[indivial_i, :] = [ 5. 4. 20. 24.]
423 cord_individual_obj[indivial_i, :] = [ 6. 4. 12. 16.]
424 cord_individual_obj[indivial_i, :] = [ 7. 6. 24. 30.]
425 cord_individual_obj[indivial_i, :] = [ 8. 4. 58. 62.]
426 cord_individual_obj[indivial_i, :] = [ 9. 4. 12. 16.]
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. 12. 16.]
434 cord_individual_obj[indivial_i, :] = [ 1. 5. 12. 17.]
435 cord_individual_obj[indivial_i, :] = [ 2. 4. 26. 30.]
436 cord_individual_obj[indivial_i, :] = [ 3. 4. 18. 22.]
437 cord_individual_obj[indivial_i, :] = [ 4. 5. 18. 23.]
438 cord_individual_obj[indivial_i, :] = [ 5. 4. 24. 28.]
439 cord_individual_obj[indivial_i, :] = [ 6. 6. 12. 18.]
440 cord_individual_obj[indivial_i, :] = [ 7. 6. 54. 60.]
441 cord_individual_obj[indivial_i, :] = [ 8. 4. 8. 12.]
442 cord_individual_obj[indivial_i, :] = [ 9. 5. 12. 17.]
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. 4. 12. 16.]
450 cord_individual_obj[indivial_i, :] = [ 1. 4. 36. 40.]
451 cord_individual_obj[indivial_i, :] = [ 2. 6. 12. 18.]
452 cord_individual_obj[indivial_i, :] = [ 3. 4. 12. 16.]
453 cord_individual_obj[indivial_i, :] = [ 4. 4. 12. 16.]
454 cord_individual_obj[indivial_i, :] = [ 5. 4. 12. 16.]
455 cord_individual_obj[indivial_i, :] = [ 6. 4. 12. 16.]
456 cord_individual_obj[indivial_i, :] = [ 7. 4. 8. 12.]
457 cord_individual_obj[indivial_i, :] = [ 8. 6. 12. 18.]
458 cord_individual_obj[indivial_i, :] = [ 9. 4. 12. 16.]
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. 4. 80. 84.]
466 cord_individual_obj[indivial_i, :] = [ 1. 4. 8. 12.]
467 cord_individual_obj[indivial_i, :] = [ 2. 4. 8. 12.]
468 cord_individual_obj[indivial_i, :] = [ 3. 4. 8. 12.]
469 cord_individual_obj[indivial_i, :] = [ 4. 5. 12. 17.]
470 cord_individual_obj[indivial_i, :] = [ 5. 4. 8. 12.]
471 cord_individual_obj[indivial_i, :] = [ 6. 6. 8. 14.]
472 cord_individual_obj[indivial_i, :] = [ 7. 6. 12. 18.]
473 cord_individual_obj[indivial_i, :] = [ 8. 4. 12. 16.]
474 cord_individual_obj[indivial_i, :] = [ 9. 5. 8. 13.]
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. 4. 8. 12.]
482 cord_individual_obj[indivial_i, :] = [ 1. 5. 52. 57.]
483 cord_individual_obj[indivial_i, :] = [ 2. 4. 12. 16.]
484 cord_individual_obj[indivial_i, :] = [ 3. 4. 12. 16.]
485 cord_individual_obj[indivial_i, :] = [ 4. 5. 12. 17.]
486 cord_individual_obj[indivial_i, :] = [ 5. 4. 12. 16.]
487 cord_individual_obj[indivial_i, :] = [ 6. 6. 12. 18.]
488 cord_individual_obj[indivial_i, :] = [ 7. 6. 44. 50.]
489 cord_individual_obj[indivial_i, :] = [ 8. 5. 12. 17.]
490 cord_individual_obj[indivial_i, :] = [ 9. 5. 12. 17.]
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. 12. 16.]
498 cord_individual_obj[indivial_i, :] = [ 1. 4. 8. 12.]
499 cord_individual_obj[indivial_i, :] = [ 2. 6. 12. 18.]

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unknown

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500 cord_individual_obj[indivial_i, :] = [ 3. 4. 18. 22.]
501 cord_individual_obj[indivial_i, :] = [ 4. 5. 16. 21.]
502 cord_individual_obj[indivial_i, :] = [ 5. 4. 12. 16.]
503 cord_individual_obj[indivial_i, :] = [ 6. 6. 16. 22.]
504 cord_individual_obj[indivial_i, :] = [ 7. 6. 20. 26.]
505 cord_individual_obj[indivial_i, :] = [ 8. 6. 36. 42.]
506 cord_individual_obj[indivial_i, :] = [ 9. 5. 12. 17.]
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. 4. 12. 16.]
514 cord_individual_obj[indivial_i, :] = [ 1. 5. 30. 35.]
515 cord_individual_obj[indivial_i, :] = [ 2. 4. 12. 16.]
516 cord_individual_obj[indivial_i, :] = [ 3. 4. 52. 56.]
517 cord_individual_obj[indivial_i, :] = [ 4. 4. 12. 16.]
518 cord_individual_obj[indivial_i, :] = [ 5. 4. 12. 16.]
519 cord_individual_obj[indivial_i, :] = [ 6. 4. 12. 16.]
520 cord_individual_obj[indivial_i, :] = [ 7. 4. 52. 56.]
521 cord_individual_obj[indivial_i, :] = [ 8. 4. 8. 12.]
522 cord_individual_obj[indivial_i, :] = [ 9. 4. 18. 22.]
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 = 99.0
534 Proportion_of_area = 0.09166666666666666
535 BEST_CHROM =
536     berth: [ 7.5 26. 20. 2.5 11.5 15. ]
537     time: [0. 0. 0. 0. 0.]
538     num_QC: [3. 2. 3. 2. 2. 3.]
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: 645.00
544 Specific arrangement for each vessel:
545 V_id: 0      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:
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
      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: 20.0      bow of i: 17.0      tail of i: 23.0      gama_i0: 0.0      gama_i1: 4
      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
548 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:
80.0      work load gap_i: 0
549 V_id: 4      li: 3.0      xi: 11.5      bow of i: 10.0      tail of i: 13.0      gama_i0: 0.0      gama_i1: 4
      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
550 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
551
552 Algorithm finished and the total CPU time: 100 s
553 End
554
```