

unknown

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1 "E:\我的文件\3\我的项目\1\我的程序\1_LW_000002\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=29124
2
3 import sys; print('Python %s on %s' % (sys.version, sys.platform))
4 sys.path.append(['E:\我的文件\3\我的项目\1\我的程序\1_LW_000002\6\2 python code\01_My_Python_Code', 'E:/我的文件/3/我的项目/1/我的程序/1_LW_000002/6/2 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:/我的文件/3/我的项目/1/我的程序/1_LW_000002/6/2 python code/01_My_Python_Code/main_BACASP_offical_PSO_2D_Bin_berth_line.py', wdir='E:/我的文件/3/我的项目/1/我的程序/1_LW_000002/6/2 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   maxIter_num = 40
23   W_inertia = 0.5
24   oder_type_num = 10
25   c1 = 1.0
26   c2 = 1.0
27   r1 = 0.5283845543396752
28   r2 = 0.5283845543396752
29 Begin iteration:
30
31 iter = 0
32   cord_individual_obj[individual_i, :] = [ 0.  5. 34. 39.]
33   cord_individual_obj[individual_i, :] = [ 1.  4. 56. 60.]
34   cord_individual_obj[individual_i, :] = [ 2.  4. 100. 104.]
35   cord_individual_obj[individual_i, :] = [ 3.  4. 38. 42.]
36   cord_individual_obj[individual_i, :] = [ 4.  6.  8. 14.]
37   cord_individual_obj[individual_i, :] = [ 5.  4. 64. 68.]
38   cord_individual_obj[individual_i, :] = [ 6.  5. 94. 99.]
39   cord_individual_obj[individual_i, :] = [ 7.  5. 52. 57.]
40   cord_individual_obj[individual_i, :] = [ 8.  5. 36. 41.]
41   cord_individual_obj[individual_i, :] = [ 9.  4. 24. 28.]
42
43 min(cord_individual_obj[:, 3]) = 14.0
44 historl_G_best_iter[iter, 3] = 14.0
45 Begin iteration:
46
47 iter = 1
48   cord_individual_obj[individual_i, :] = [ 0.  5. 34. 39.]
49   cord_individual_obj[individual_i, :] = [ 1.  5. 32. 37.]
50   cord_individual_obj[individual_i, :] = [ 2.  6.  8. 14.]
51   cord_individual_obj[individual_i, :] = [ 3.  3. 68. 71.]
52   cord_individual_obj[individual_i, :] = [ 4.  5. 24. 29.]
53   cord_individual_obj[individual_i, :] = [ 5.  4. 100. 104.]
54   cord_individual_obj[individual_i, :] = [ 6.  5. 92. 97.]
55   cord_individual_obj[individual_i, :] = [ 7.  4. 26. 30.]
56   cord_individual_obj[individual_i, :] = [ 8.  5. 30. 35.]
57   cord_individual_obj[individual_i, :] = [ 9.  4. 12. 16.]
58
59 min(cord_individual_obj[:, 3]) = 14.0
60 historl_G_best_iter[iter, 3] = 14.0
61 Begin iteration:
62
63 iter = 2
64   cord_individual_obj[individual_i, :] = [ 0.  6. 36. 42.]
65   cord_individual_obj[individual_i, :] = [ 1.  6. 34. 40.]
66   cord_individual_obj[individual_i, :] = [ 2.  5. 44. 49.]
67   cord_individual_obj[individual_i, :] = [ 3.  6. 20. 26.]
68   cord_individual_obj[individual_i, :] = [ 4.  6.  8. 14.]
69   cord_individual_obj[individual_i, :] = [ 5.  6.  8. 14.]
70   cord_individual_obj[individual_i, :] = [ 6.  5. 40. 45.]
71   cord_individual_obj[individual_i, :] = [ 7.  6. 12. 18.]
72   cord_individual_obj[individual_i, :] = [ 8.  6. 28. 34.]
73   cord_individual_obj[individual_i, :] = [ 9.  5. 20. 25.]
74
75 min(cord_individual_obj[:, 3]) = 14.0
76 historl_G_best_iter[iter, 3] = 14.0
77 Begin iteration:
78
79 iter = 3

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80  cord_individual_obj[indivial_i,:] = [ 0. 6. 36. 42.]
81  cord_individual_obj[indivial_i,:] = [ 1. 6. 44. 50.]
82  cord_individual_obj[indivial_i,:] = [ 2. 6. 8. 14.]
83  cord_individual_obj[indivial_i,:] = [ 3. 5. 48. 53.]
84  cord_individual_obj[indivial_i,:] = [ 4. 6. 28. 34.]
85  cord_individual_obj[indivial_i,:] = [ 5. 6. 84. 90.]
86  cord_individual_obj[indivial_i,:] = [ 6. 6. 28. 34.]
87  cord_individual_obj[indivial_i,:] = [ 7. 6. 84. 90.]
88  cord_individual_obj[indivial_i,:] = [ 8. 5. 48. 53.]
89  cord_individual_obj[indivial_i,:] = [ 9. 6. 38. 44.]
90
91 min(cord_individual_obj[:,3]) = 14.0
92 historl_G_best_iter[iter,3] = 14.0
93 Begin iteration:
94
95 iter = 4
96  cord_individual_obj[indivial_i,:] = [ 0. 6. 28. 34.]
97  cord_individual_obj[indivial_i,:] = [ 1. 6. 24. 30.]
98  cord_individual_obj[indivial_i,:] = [ 2. 5. 28. 33.]
99  cord_individual_obj[indivial_i,:] = [ 3. 5. 44. 49.]
100 cord_individual_obj[indivial_i,:] = [ 4. 5. 58. 63.]
101 cord_individual_obj[indivial_i,:] = [ 5. 6. 8. 14.]
102 cord_individual_obj[indivial_i,:] = [ 6. 6. 28. 34.]
103 cord_individual_obj[indivial_i,:] = [ 7. 4. 14. 18.]
104 cord_individual_obj[indivial_i,:] = [ 8. 6. 8. 14.]
105 cord_individual_obj[indivial_i,:] = [ 9. 6. 76. 82.]
106
107 min(cord_individual_obj[:,3]) = 14.0
108 historl_G_best_iter[iter,3] = 14.0
109 Begin iteration:
110
111 iter = 5
112  cord_individual_obj[indivial_i,:] = [ 0. 6. 32. 38.]
113  cord_individual_obj[indivial_i,:] = [ 1. 6. 82. 88.]
114  cord_individual_obj[indivial_i,:] = [ 2. 5. 28. 33.]
115  cord_individual_obj[indivial_i,:] = [ 3. 6. 12. 18.]
116  cord_individual_obj[indivial_i,:] = [ 4. 6. 32. 38.]
117  cord_individual_obj[indivial_i,:] = [ 5. 6. 56. 62.]
118  cord_individual_obj[indivial_i,:] = [ 6. 6. 32. 38.]
119  cord_individual_obj[indivial_i,:] = [ 7. 5. 38. 43.]
120  cord_individual_obj[indivial_i,:] = [ 8. 5. 56. 61.]
121  cord_individual_obj[indivial_i,:] = [ 9. 6. 8. 14.]
122
123 min(cord_individual_obj[:,3]) = 14.0
124 historl_G_best_iter[iter,3] = 14.0
125 Begin iteration:
126
127 iter = 6
128  cord_individual_obj[indivial_i,:] = [ 0. 6. 52. 58.]
129  cord_individual_obj[indivial_i,:] = [ 1. 6. 8. 14.]
130  cord_individual_obj[indivial_i,:] = [ 2. 6. 32. 38.]
131  cord_individual_obj[indivial_i,:] = [ 3. 6. 52. 58.]
132  cord_individual_obj[indivial_i,:] = [ 4. 5. 60. 65.]
133  cord_individual_obj[indivial_i,:] = [ 5. 6. 48. 54.]
134  cord_individual_obj[indivial_i,:] = [ 6. 6. 28. 34.]
135  cord_individual_obj[indivial_i,:] = [ 7. 6. 28. 34.]
136  cord_individual_obj[indivial_i,:] = [ 8. 6. 28. 34.]
137  cord_individual_obj[indivial_i,:] = [ 9. 6. 54. 60.]
138
139 min(cord_individual_obj[:,3]) = 14.0
140 historl_G_best_iter[iter,3] = 14.0
141 Begin iteration:
142
143 iter = 7
144  cord_individual_obj[indivial_i,:] = [ 0. 6. 16. 22.]
145  cord_individual_obj[indivial_i,:] = [ 1. 6. 72. 78.]
146  cord_individual_obj[indivial_i,:] = [ 2. 6. 32. 38.]
147  cord_individual_obj[indivial_i,:] = [ 3. 6. 24. 30.]
148  cord_individual_obj[indivial_i,:] = [ 4. 6. 8. 14.]
149  cord_individual_obj[indivial_i,:] = [ 5. 6. 24. 30.]
150  cord_individual_obj[indivial_i,:] = [ 6. 6. 16. 22.]
151  cord_individual_obj[indivial_i,:] = [ 7. 6. 8. 14.]
152  cord_individual_obj[indivial_i,:] = [ 8. 5. 8. 13.]
153  cord_individual_obj[indivial_i,:] = [ 9. 6. 22. 28.]
154
155 min(cord_individual_obj[:,3]) = 13.0
156 historl_G_best_iter[iter,3] = 13.0
157 Begin iteration:
158
159 iter = 8
160  cord_individual_obj[indivial_i,:] = [ 0. 5. 28. 33.]
161  cord_individual_obj[indivial_i,:] = [ 1. 5. 8. 13.]
162  cord_individual_obj[indivial_i,:] = [ 2. 5. 24. 29.]
163  cord_individual_obj[indivial_i,:] = [ 3. 5. 44. 49.]

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164 cord_individual_obj[indivial_i,:] = [ 4. 5. 60. 65.]
165 cord_individual_obj[indivial_i,:] = [ 5. 5. 68. 73.]
166 cord_individual_obj[indivial_i,:] = [ 6. 5. 28. 33.]
167 cord_individual_obj[indivial_i,:] = [ 7. 5. 52. 57.]
168 cord_individual_obj[indivial_i,:] = [ 8. 5. 44. 49.]
169 cord_individual_obj[indivial_i,:] = [ 9. 5. 104. 109.]
170
171 min(cord_individual_obj[:,3]) = 13.0
172 historl_G_best_iter[iter,3] = 13.0
173 Begin iteration:
174
175 iter = 9
176 cord_individual_obj[indivial_i,:] = [ 0. 5. 44. 49.]
177 cord_individual_obj[indivial_i,:] = [ 1. 4. 24. 28.]
178 cord_individual_obj[indivial_i,:] = [ 2. 5. 24. 29.]
179 cord_individual_obj[indivial_i,:] = [ 3. 5. 24. 29.]
180 cord_individual_obj[indivial_i,:] = [ 4. 5. 24. 29.]
181 cord_individual_obj[indivial_i,:] = [ 5. 5. 160. 165.]
182 cord_individual_obj[indivial_i,:] = [ 6. 5. 28. 33.]
183 cord_individual_obj[indivial_i,:] = [ 7. 5. 24. 29.]
184 cord_individual_obj[indivial_i,:] = [ 8. 5. 44. 49.]
185 cord_individual_obj[indivial_i,:] = [ 9. 5. 8. 13.]
186
187 min(cord_individual_obj[:,3]) = 13.0
188 historl_G_best_iter[iter,3] = 13.0
189 Begin iteration:
190
191 iter = 10
192 cord_individual_obj[indivial_i,:] = [ 0. 5. 92. 97.]
193 cord_individual_obj[indivial_i,:] = [ 1. 3. 14. 17.]
194 cord_individual_obj[indivial_i,:] = [ 2. 5. 8. 13.]
195 cord_individual_obj[indivial_i,:] = [ 3. 5. 8. 13.]
196 cord_individual_obj[indivial_i,:] = [ 4. 5. 40. 45.]
197 cord_individual_obj[indivial_i,:] = [ 5. 5. 8. 13.]
198 cord_individual_obj[indivial_i,:] = [ 6. 5. 8. 13.]
199 cord_individual_obj[indivial_i,:] = [ 7. 3. 14. 17.]
200 cord_individual_obj[indivial_i,:] = [ 8. 5. 8. 13.]
201 cord_individual_obj[indivial_i,:] = [ 9. 5. 124. 129.]
202
203 min(cord_individual_obj[:,3]) = 13.0
204 historl_G_best_iter[iter,3] = 13.0
205 Begin iteration:
206
207 iter = 11
208 cord_individual_obj[indivial_i,:] = [ 0. 5. 24. 29.]
209 cord_individual_obj[indivial_i,:] = [ 1. 5. 38. 43.]
210 cord_individual_obj[indivial_i,:] = [ 2. 5. 24. 29.]
211 cord_individual_obj[indivial_i,:] = [ 3. 5. 28. 33.]
212 cord_individual_obj[indivial_i,:] = [ 4. 5. 24. 29.]
213 cord_individual_obj[indivial_i,:] = [ 5. 5. 112. 117.]
214 cord_individual_obj[indivial_i,:] = [ 6. 5. 52. 57.]
215 cord_individual_obj[indivial_i,:] = [ 7. 5. 24. 29.]
216 cord_individual_obj[indivial_i,:] = [ 8. 5. 44. 49.]
217 cord_individual_obj[indivial_i,:] = [ 9. 5. 8. 13.]
218
219 min(cord_individual_obj[:,3]) = 13.0
220 historl_G_best_iter[iter,3] = 13.0
221 Begin iteration:
222
223 iter = 12
224 cord_individual_obj[indivial_i,:] = [ 0. 5. 56. 61.]
225 cord_individual_obj[indivial_i,:] = [ 1. 4. 20. 24.]
226 cord_individual_obj[indivial_i,:] = [ 2. 5. 12. 17.]
227 cord_individual_obj[indivial_i,:] = [ 3. 5. 12. 17.]
228 cord_individual_obj[indivial_i,:] = [ 4. 5. 38. 43.]
229 cord_individual_obj[indivial_i,:] = [ 5. 5. 8. 13.]
230 cord_individual_obj[indivial_i,:] = [ 6. 5. 24. 29.]
231 cord_individual_obj[indivial_i,:] = [ 7. 4. 26. 30.]
232 cord_individual_obj[indivial_i,:] = [ 8. 5. 8. 13.]
233 cord_individual_obj[indivial_i,:] = [ 9. 5. 54. 59.]
234
235 min(cord_individual_obj[:,3]) = 13.0
236 historl_G_best_iter[iter,3] = 13.0
237 Begin iteration:
238
239 iter = 13
240 cord_individual_obj[indivial_i,:] = [ 0. 5. 8. 13.]
241 cord_individual_obj[indivial_i,:] = [ 1. 4. 52. 56.]
242 cord_individual_obj[indivial_i,:] = [ 2. 5. 28. 33.]
243 cord_individual_obj[indivial_i,:] = [ 3. 5. 44. 49.]
244 cord_individual_obj[indivial_i,:] = [ 4. 5. 24. 29.]
245 cord_individual_obj[indivial_i,:] = [ 5. 5. 72. 77.]
246 cord_individual_obj[indivial_i,:] = [ 6. 5. 28. 33.]
247 cord_individual_obj[indivial_i,:] = [ 7. 5. 24. 29.]

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248     cord_individual_obj[indivial_i, :] = [ 8. 5. 44. 49.]
249     cord_individual_obj[indivial_i, :] = [ 9. 5. 106. 111.]
250
251     min(cord_individual_obj[:, 3]) = 13.0
252     historl_G_best_iter[iter, 3] = 13.0
253 Begin iteration:
254
255 iter = 14
256     cord_individual_obj[indivial_i, :] = [ 0. 5. 44. 49.]
257     cord_individual_obj[indivial_i, :] = [ 1. 5. 24. 29.]
258     cord_individual_obj[indivial_i, :] = [ 2. 5. 24. 29.]
259     cord_individual_obj[indivial_i, :] = [ 3. 5. 12. 17.]
260     cord_individual_obj[indivial_i, :] = [ 4. 5. 38. 43.]
261     cord_individual_obj[indivial_i, :] = [ 5. 5. 12. 17.]
262     cord_individual_obj[indivial_i, :] = [ 6. 5. 24. 29.]
263     cord_individual_obj[indivial_i, :] = [ 7. 4. 24. 28.]
264     cord_individual_obj[indivial_i, :] = [ 8. 5. 12. 17.]
265     cord_individual_obj[indivial_i, :] = [ 9. 5. 8. 13.]
266
267     min(cord_individual_obj[:, 3]) = 13.0
268     historl_G_best_iter[iter, 3] = 13.0
269 Begin iteration:
270
271 iter = 15
272     cord_individual_obj[indivial_i, :] = [ 0. 5. 8. 13.]
273     cord_individual_obj[indivial_i, :] = [ 1. 3. 66. 69.]
274     cord_individual_obj[indivial_i, :] = [ 2. 6. 20. 26.]
275     cord_individual_obj[indivial_i, :] = [ 3. 6. 20. 26.]
276     cord_individual_obj[indivial_i, :] = [ 4. 6. 8. 14.]
277     cord_individual_obj[indivial_i, :] = [ 5. 5. 44. 49.]
278     cord_individual_obj[indivial_i, :] = [ 6. 5. 16. 21.]
279     cord_individual_obj[indivial_i, :] = [ 7. 6. 8. 14.]
280     cord_individual_obj[indivial_i, :] = [ 8. 5. 20. 25.]
281     cord_individual_obj[indivial_i, :] = [ 9. 5. 100. 105.]
282
283     min(cord_individual_obj[:, 3]) = 13.0
284     historl_G_best_iter[iter, 3] = 13.0
285 Begin iteration:
286
287 iter = 16
288     cord_individual_obj[indivial_i, :] = [ 0. 5. 44. 49.]
289     cord_individual_obj[indivial_i, :] = [ 1. 5. 24. 29.]
290     cord_individual_obj[indivial_i, :] = [ 2. 5. 16. 21.]
291     cord_individual_obj[indivial_i, :] = [ 3. 6. 12. 18.]
292     cord_individual_obj[indivial_i, :] = [ 4. 5. 28. 33.]
293     cord_individual_obj[indivial_i, :] = [ 5. 5. 40. 45.]
294     cord_individual_obj[indivial_i, :] = [ 6. 5. 48. 53.]
295     cord_individual_obj[indivial_i, :] = [ 7. 6. 24. 30.]
296     cord_individual_obj[indivial_i, :] = [ 8. 5. 12. 17.]
297     cord_individual_obj[indivial_i, :] = [ 9. 5. 8. 13.]
298
299     min(cord_individual_obj[:, 3]) = 13.0
300     historl_G_best_iter[iter, 3] = 13.0
301 Begin iteration:
302
303 iter = 17
304     cord_individual_obj[indivial_i, :] = [ 0. 5. 28. 33.]
305     cord_individual_obj[indivial_i, :] = [ 1. 4. 28. 32.]
306     cord_individual_obj[indivial_i, :] = [ 2. 5. 28. 33.]
307     cord_individual_obj[indivial_i, :] = [ 3. 5. 60. 65.]
308     cord_individual_obj[indivial_i, :] = [ 4. 5. 24. 29.]
309     cord_individual_obj[indivial_i, :] = [ 5. 5. 28. 33.]
310     cord_individual_obj[indivial_i, :] = [ 6. 5. 8. 13.]
311     cord_individual_obj[indivial_i, :] = [ 7. 5. 44. 49.]
312     cord_individual_obj[indivial_i, :] = [ 8. 5. 44. 49.]
313     cord_individual_obj[indivial_i, :] = [ 9. 5. 112. 117.]
314
315     min(cord_individual_obj[:, 3]) = 13.0
316     historl_G_best_iter[iter, 3] = 13.0
317 Begin iteration:
318
319 iter = 18
320     cord_individual_obj[indivial_i, :] = [ 0. 5. 56. 61.]
321     cord_individual_obj[indivial_i, :] = [ 1. 5. 20. 25.]
322     cord_individual_obj[indivial_i, :] = [ 2. 5. 28. 33.]
323     cord_individual_obj[indivial_i, :] = [ 3. 5. 12. 17.]
324     cord_individual_obj[indivial_i, :] = [ 4. 6. 30. 36.]
325     cord_individual_obj[indivial_i, :] = [ 5. 5. 64. 69.]
326     cord_individual_obj[indivial_i, :] = [ 6. 5. 28. 33.]
327     cord_individual_obj[indivial_i, :] = [ 7. 5. 12. 17.]
328     cord_individual_obj[indivial_i, :] = [ 8. 5. 8. 13.]
329     cord_individual_obj[indivial_i, :] = [ 9. 5. 8. 13.]
330
331     min(cord_individual_obj[:, 3]) = 13.0

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332 historl_G_best_iter[iter, 3] = 13.0
333 Begin iteration:
334
335 iter = 19
336 cord_individual_obj[indivial_i, :] = [ 0. 5. 28. 33.]
337 cord_individual_obj[indivial_i, :] = [ 1. 4. 28. 32.]
338 cord_individual_obj[indivial_i, :] = [ 2. 6. 32. 38.]
339 cord_individual_obj[indivial_i, :] = [ 3. 6. 52. 58.]
340 cord_individual_obj[indivial_i, :] = [ 4. 6. 24. 30.]
341 cord_individual_obj[indivial_i, :] = [ 5. 5. 8. 13.]
342 cord_individual_obj[indivial_i, :] = [ 6. 5. 28. 33.]
343 cord_individual_obj[indivial_i, :] = [ 7. 6. 48. 54.]
344 cord_individual_obj[indivial_i, :] = [ 8. 6. 28. 34.]
345 cord_individual_obj[indivial_i, :] = [ 9. 5. 48. 53.]
346
347 min(cord_individual_obj[:, 3]) = 13.0
348 historl_G_best_iter[iter, 3] = 13.0
349 Begin iteration:
350
351 iter = 20
352 cord_individual_obj[indivial_i, :] = [ 0. 5. 28. 33.]
353 cord_individual_obj[indivial_i, :] = [ 1. 4. 52. 56.]
354 cord_individual_obj[indivial_i, :] = [ 2. 6. 28. 34.]
355 cord_individual_obj[indivial_i, :] = [ 3. 5. 8. 13.]
356 cord_individual_obj[indivial_i, :] = [ 4. 6. 28. 34.]
357 cord_individual_obj[indivial_i, :] = [ 5. 5. 48. 53.]
358 cord_individual_obj[indivial_i, :] = [ 6. 5. 28. 33.]
359 cord_individual_obj[indivial_i, :] = [ 7. 6. 38. 44.]
360 cord_individual_obj[indivial_i, :] = [ 8. 6. 48. 54.]
361 cord_individual_obj[indivial_i, :] = [ 9. 5. 24. 29.]
362
363 min(cord_individual_obj[:, 3]) = 13.0
364 historl_G_best_iter[iter, 3] = 13.0
365 Begin iteration:
366
367 iter = 21
368 cord_individual_obj[indivial_i, :] = [ 0. 5. 28. 33.]
369 cord_individual_obj[indivial_i, :] = [ 1. 5. 8. 13.]
370 cord_individual_obj[indivial_i, :] = [ 2. 6. 28. 34.]
371 cord_individual_obj[indivial_i, :] = [ 3. 6. 60. 66.]
372 cord_individual_obj[indivial_i, :] = [ 4. 6. 42. 48.]
373 cord_individual_obj[indivial_i, :] = [ 5. 5. 28. 33.]
374 cord_individual_obj[indivial_i, :] = [ 6. 5. 32. 37.]
375 cord_individual_obj[indivial_i, :] = [ 7. 6. 28. 34.]
376 cord_individual_obj[indivial_i, :] = [ 8. 6. 24. 30.]
377 cord_individual_obj[indivial_i, :] = [ 9. 5. 28. 33.]
378
379 min(cord_individual_obj[:, 3]) = 13.0
380 historl_G_best_iter[iter, 3] = 13.0
381 Begin iteration:
382
383 iter = 22
384 cord_individual_obj[indivial_i, :] = [ 0. 5. 22. 27.]
385 cord_individual_obj[indivial_i, :] = [ 1. 4. 38. 42.]
386 cord_individual_obj[indivial_i, :] = [ 2. 5. 20. 25.]
387 cord_individual_obj[indivial_i, :] = [ 3. 5. 8. 13.]
388 cord_individual_obj[indivial_i, :] = [ 4. 5. 34. 39.]
389 cord_individual_obj[indivial_i, :] = [ 5. 5. 22. 27.]
390 cord_individual_obj[indivial_i, :] = [ 6. 5. 22. 27.]
391 cord_individual_obj[indivial_i, :] = [ 7. 4. 14. 18.]
392 cord_individual_obj[indivial_i, :] = [ 8. 6. 8. 14.]
393 cord_individual_obj[indivial_i, :] = [ 9. 5. 28. 33.]
394
395 min(cord_individual_obj[:, 3]) = 13.0
396 historl_G_best_iter[iter, 3] = 13.0
397 Begin iteration:
398
399 iter = 23
400 cord_individual_obj[indivial_i, :] = [ 0. 5. 28. 33.]
401 cord_individual_obj[indivial_i, :] = [ 1. 5. 8. 13.]
402 cord_individual_obj[indivial_i, :] = [ 2. 5. 28. 33.]
403 cord_individual_obj[indivial_i, :] = [ 3. 6. 48. 54.]
404 cord_individual_obj[indivial_i, :] = [ 4. 5. 28. 33.]
405 cord_individual_obj[indivial_i, :] = [ 5. 5. 48. 53.]
406 cord_individual_obj[indivial_i, :] = [ 6. 5. 32. 37.]
407 cord_individual_obj[indivial_i, :] = [ 7. 5. 28. 33.]
408 cord_individual_obj[indivial_i, :] = [ 8. 6. 24. 30.]
409 cord_individual_obj[indivial_i, :] = [ 9. 5. 38. 43.]
410
411 min(cord_individual_obj[:, 3]) = 13.0
412 historl_G_best_iter[iter, 3] = 13.0
413 Begin iteration:
414
415 iter = 24
```

```

416 cord_individual_obj[indivial_i,:] = [ 0. 5. 22. 27.]
417 cord_individual_obj[indivial_i,:] = [ 1. 4. 66. 70.]
418 cord_individual_obj[indivial_i,:] = [ 2. 5. 32. 37.]
419 cord_individual_obj[indivial_i,:] = [ 3. 5. 8. 13.]
420 cord_individual_obj[indivial_i,:] = [ 4. 5. 28. 33.]
421 cord_individual_obj[indivial_i,:] = [ 5. 5. 32. 37.]
422 cord_individual_obj[indivial_i,:] = [ 6. 5. 22. 27.]
423 cord_individual_obj[indivial_i,:] = [ 7. 4. 32. 36.]
424 cord_individual_obj[indivial_i,:] = [ 8. 6. 20. 26.]
425 cord_individual_obj[indivial_i,:] = [ 9. 5. 128. 133.]
426
427 min(cord_individual_obj[:,3]) = 13.0
428 historl_G_best_iter[iter,3] = 13.0
429 Begin iteration:
430
431 iter = 25
432 cord_individual_obj[indivial_i,:] = [ 0. 5. 28. 33.]
433 cord_individual_obj[indivial_i,:] = [ 1. 5. 28. 33.]
434 cord_individual_obj[indivial_i,:] = [ 2. 6. 28. 34.]
435 cord_individual_obj[indivial_i,:] = [ 3. 6. 80. 86.]
436 cord_individual_obj[indivial_i,:] = [ 4. 6. 88. 94.]
437 cord_individual_obj[indivial_i,:] = [ 5. 5. 20. 25.]
438 cord_individual_obj[indivial_i,:] = [ 6. 5. 28. 33.]
439 cord_individual_obj[indivial_i,:] = [ 7. 6. 30. 36.]
440 cord_individual_obj[indivial_i,:] = [ 8. 6. 24. 30.]
441 cord_individual_obj[indivial_i,:] = [ 9. 5. 8. 13.]
442
443 min(cord_individual_obj[:,3]) = 13.0
444 historl_G_best_iter[iter,3] = 13.0
445 Begin iteration:
446
447 iter = 26
448 cord_individual_obj[indivial_i,:] = [ 0. 5. 22. 27.]
449 cord_individual_obj[indivial_i,:] = [ 1. 4. 42. 46.]
450 cord_individual_obj[indivial_i,:] = [ 2. 6. 16. 22.]
451 cord_individual_obj[indivial_i,:] = [ 3. 6. 12. 18.]
452 cord_individual_obj[indivial_i,:] = [ 4. 5. 8. 13.]
453 cord_individual_obj[indivial_i,:] = [ 5. 5. 20. 25.]
454 cord_individual_obj[indivial_i,:] = [ 6. 5. 22. 27.]
455 cord_individual_obj[indivial_i,:] = [ 7. 6. 24. 30.]
456 cord_individual_obj[indivial_i,:] = [ 8. 6. 8. 14.]
457 cord_individual_obj[indivial_i,:] = [ 9. 5. 48. 53.]
458
459 min(cord_individual_obj[:,3]) = 13.0
460 historl_G_best_iter[iter,3] = 13.0
461 Begin iteration:
462
463 iter = 27
464 cord_individual_obj[indivial_i,:] = [ 0. 5. 48. 53.]
465 cord_individual_obj[indivial_i,:] = [ 1. 5. 66. 71.]
466 cord_individual_obj[indivial_i,:] = [ 2. 6. 28. 34.]
467 cord_individual_obj[indivial_i,:] = [ 3. 6. 38. 44.]
468 cord_individual_obj[indivial_i,:] = [ 4. 6. 80. 86.]
469 cord_individual_obj[indivial_i,:] = [ 5. 5. 48. 53.]
470 cord_individual_obj[indivial_i,:] = [ 6. 5. 28. 33.]
471 cord_individual_obj[indivial_i,:] = [ 7. 6. 80. 86.]
472 cord_individual_obj[indivial_i,:] = [ 8. 6. 28. 34.]
473 cord_individual_obj[indivial_i,:] = [ 9. 5. 8. 13.]
474
475 min(cord_individual_obj[:,3]) = 13.0
476 historl_G_best_iter[iter,3] = 13.0
477 Begin iteration:
478
479 iter = 28
480 cord_individual_obj[indivial_i,:] = [ 0. 5. 28. 33.]
481 cord_individual_obj[indivial_i,:] = [ 1. 4. 28. 32.]
482 cord_individual_obj[indivial_i,:] = [ 2. 6. 24. 30.]
483 cord_individual_obj[indivial_i,:] = [ 3. 6. 28. 34.]
484 cord_individual_obj[indivial_i,:] = [ 4. 5. 8. 13.]
485 cord_individual_obj[indivial_i,:] = [ 5. 5. 28. 33.]
486 cord_individual_obj[indivial_i,:] = [ 6. 5. 32. 37.]
487 cord_individual_obj[indivial_i,:] = [ 7. 6. 24. 30.]
488 cord_individual_obj[indivial_i,:] = [ 8. 6. 44. 50.]
489 cord_individual_obj[indivial_i,:] = [ 9. 5. 48. 53.]
490
491 min(cord_individual_obj[:,3]) = 13.0
492 historl_G_best_iter[iter,3] = 13.0
493 Begin iteration:
494
495 iter = 29
496 cord_individual_obj[indivial_i,:] = [ 0. 5. 22. 27.]
497 cord_individual_obj[indivial_i,:] = [ 1. 4. 42. 46.]
498 cord_individual_obj[indivial_i,:] = [ 2. 6. 20. 26.]
499 cord_individual_obj[indivial_i,:] = [ 3. 5. 22. 27.]

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500 cord_individual_obj[indivial_i,:] = [ 4. 6. 52. 58.]
501 cord_individual_obj[indivial_i,:] = [ 5. 5. 22. 27.]
502 cord_individual_obj[indivial_i,:] = [ 6. 5. 22. 27.]
503 cord_individual_obj[indivial_i,:] = [ 7. 5. 8. 13.]
504 cord_individual_obj[indivial_i,:] = [ 8. 6. 16. 22.]
505 cord_individual_obj[indivial_i,:] = [ 9. 5. 8. 13.]
506
507 min(cord_individual_obj[:,3]) = 13.0
508 historl_G_best_iter[iter,3] = 13.0
509 Begin iteration:
510
511 iter = 30
512 cord_individual_obj[indivial_i,:] = [ 0. 5. 24. 29.]
513 cord_individual_obj[indivial_i,:] = [ 1. 4. 24. 28.]
514 cord_individual_obj[indivial_i,:] = [ 2. 5. 44. 49.]
515 cord_individual_obj[indivial_i,:] = [ 3. 5. 24. 29.]
516 cord_individual_obj[indivial_i,:] = [ 4. 5. 8. 13.]
517 cord_individual_obj[indivial_i,:] = [ 5. 5. 24. 29.]
518 cord_individual_obj[indivial_i,:] = [ 6. 5. 60. 65.]
519 cord_individual_obj[indivial_i,:] = [ 7. 4. 24. 28.]
520 cord_individual_obj[indivial_i,:] = [ 8. 5. 24. 29.]
521 cord_individual_obj[indivial_i,:] = [ 9. 5. 76. 81.]
522
523 min(cord_individual_obj[:,3]) = 13.0
524 historl_G_best_iter[iter,3] = 13.0
525 Begin iteration:
526
527 iter = 31
528 cord_individual_obj[indivial_i,:] = [ 0. 5. 24. 29.]
529 cord_individual_obj[indivial_i,:] = [ 1. 4. 24. 28.]
530 cord_individual_obj[indivial_i,:] = [ 2. 5. 44. 49.]
531 cord_individual_obj[indivial_i,:] = [ 3. 5. 24. 29.]
532 cord_individual_obj[indivial_i,:] = [ 4. 5. 24. 29.]
533 cord_individual_obj[indivial_i,:] = [ 5. 5. 62. 67.]
534 cord_individual_obj[indivial_i,:] = [ 6. 5. 60. 65.]
535 cord_individual_obj[indivial_i,:] = [ 7. 5. 24. 29.]
536 cord_individual_obj[indivial_i,:] = [ 8. 5. 24. 29.]
537 cord_individual_obj[indivial_i,:] = [ 9. 5. 8. 13.]
538
539 min(cord_individual_obj[:,3]) = 13.0
540 historl_G_best_iter[iter,3] = 13.0
541 Begin iteration:
542
543 iter = 32
544 cord_individual_obj[indivial_i,:] = [ 0. 5. 24. 29.]
545 cord_individual_obj[indivial_i,:] = [ 1. 5. 24. 29.]
546 cord_individual_obj[indivial_i,:] = [ 2. 5. 44. 49.]
547 cord_individual_obj[indivial_i,:] = [ 3. 5. 24. 29.]
548 cord_individual_obj[indivial_i,:] = [ 4. 5. 24. 29.]
549 cord_individual_obj[indivial_i,:] = [ 5. 5. 8. 13.]
550 cord_individual_obj[indivial_i,:] = [ 6. 5. 60. 65.]
551 cord_individual_obj[indivial_i,:] = [ 7. 4. 24. 28.]
552 cord_individual_obj[indivial_i,:] = [ 8. 5. 24. 29.]
553 cord_individual_obj[indivial_i,:] = [ 9. 5. 32. 37.]
554
555 min(cord_individual_obj[:,3]) = 13.0
556 historl_G_best_iter[iter,3] = 13.0
557 Begin iteration:
558
559 iter = 33
560 cord_individual_obj[indivial_i,:] = [ 0. 5. 56. 61.]
561 cord_individual_obj[indivial_i,:] = [ 1. 4. 62. 66.]
562 cord_individual_obj[indivial_i,:] = [ 2. 5. 8. 13.]
563 cord_individual_obj[indivial_i,:] = [ 3. 5. 20. 25.]
564 cord_individual_obj[indivial_i,:] = [ 4. 5. 48. 53.]
565 cord_individual_obj[indivial_i,:] = [ 5. 5. 62. 67.]
566 cord_individual_obj[indivial_i,:] = [ 6. 5. 8. 13.]
567 cord_individual_obj[indivial_i,:] = [ 7. 5. 8. 13.]
568 cord_individual_obj[indivial_i,:] = [ 8. 5. 8. 13.]
569 cord_individual_obj[indivial_i,:] = [ 9. 5. 8. 13.]
570
571 min(cord_individual_obj[:,3]) = 13.0
572 historl_G_best_iter[iter,3] = 13.0
573 Begin iteration:
574
575 iter = 34
576 cord_individual_obj[indivial_i,:] = [ 0. 5. 48. 53.]
577 cord_individual_obj[indivial_i,:] = [ 1. 5. 40. 45.]
578 cord_individual_obj[indivial_i,:] = [ 2. 5. 66. 71.]
579 cord_individual_obj[indivial_i,:] = [ 3. 5. 28. 33.]
580 cord_individual_obj[indivial_i,:] = [ 4. 5. 38. 43.]
581 cord_individual_obj[indivial_i,:] = [ 5. 5. 8. 13.]
582 cord_individual_obj[indivial_i,:] = [ 6. 5. 60. 65.]
583 cord_individual_obj[indivial_i,:] = [ 7. 4. 88. 92.]

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584     cord_individual_obj[indivial_i, :] = [ 8. 5. 44. 49.]
585     cord_individual_obj[indivial_i, :] = [ 9. 5. 52. 57.]
586
587     min(cord_individual_obj[:, 3]) = 13.0
588     historl_G_best_iter[iter, 3] = 13.0
589 Begin iteration:
590
591 iter = 35
592     cord_individual_obj[indivial_i, :] = [ 0. 5. 34. 39.]
593     cord_individual_obj[indivial_i, :] = [ 1. 4. 108. 112.]
594     cord_individual_obj[indivial_i, :] = [ 2. 6. 8. 14.]
595     cord_individual_obj[indivial_i, :] = [ 3. 5. 28. 33.]
596     cord_individual_obj[indivial_i, :] = [ 4. 6. 16. 22.]
597     cord_individual_obj[indivial_i, :] = [ 5. 5. 46. 51.]
598     cord_individual_obj[indivial_i, :] = [ 6. 5. 16. 21.]
599     cord_individual_obj[indivial_i, :] = [ 7. 5. 8. 13.]
600     cord_individual_obj[indivial_i, :] = [ 8. 5. 8. 13.]
601     cord_individual_obj[indivial_i, :] = [ 9. 5. 8. 13.]
602
603     min(cord_individual_obj[:, 3]) = 13.0
604     historl_G_best_iter[iter, 3] = 13.0
605 Begin iteration:
606
607 iter = 36
608     cord_individual_obj[indivial_i, :] = [ 0. 5. 34. 39.]
609     cord_individual_obj[indivial_i, :] = [ 1. 5. 8. 13.]
610     cord_individual_obj[indivial_i, :] = [ 2. 6. 60. 66.]
611     cord_individual_obj[indivial_i, :] = [ 3. 5. 44. 49.]
612     cord_individual_obj[indivial_i, :] = [ 4. 6. 36. 42.]
613     cord_individual_obj[indivial_i, :] = [ 5. 5. 78. 83.]
614     cord_individual_obj[indivial_i, :] = [ 6. 5. 44. 49.]
615     cord_individual_obj[indivial_i, :] = [ 7. 5. 28. 33.]
616     cord_individual_obj[indivial_i, :] = [ 8. 5. 38. 43.]
617     cord_individual_obj[indivial_i, :] = [ 9. 5. 38. 43.]
618
619     min(cord_individual_obj[:, 3]) = 13.0
620     historl_G_best_iter[iter, 3] = 13.0
621 Begin iteration:
622
623 iter = 37
624     cord_individual_obj[indivial_i, :] = [ 0. 5. 34. 39.]
625     cord_individual_obj[indivial_i, :] = [ 1. 4. 28. 32.]
626     cord_individual_obj[indivial_i, :] = [ 2. 6. 8. 14.]
627     cord_individual_obj[indivial_i, :] = [ 3. 6. 28. 34.]
628     cord_individual_obj[indivial_i, :] = [ 4. 5. 28. 33.]
629     cord_individual_obj[indivial_i, :] = [ 5. 5. 8. 13.]
630     cord_individual_obj[indivial_i, :] = [ 6. 5. 68. 73.]
631     cord_individual_obj[indivial_i, :] = [ 7. 6. 12. 18.]
632     cord_individual_obj[indivial_i, :] = [ 8. 5. 8. 13.]
633     cord_individual_obj[indivial_i, :] = [ 9. 5. 8. 13.]
634
635     min(cord_individual_obj[:, 3]) = 13.0
636     historl_G_best_iter[iter, 3] = 13.0
637 Begin iteration:
638
639 iter = 38
640     cord_individual_obj[indivial_i, :] = [ 0. 5. 34. 39.]
641     cord_individual_obj[indivial_i, :] = [ 1. 4. 14. 18.]
642     cord_individual_obj[indivial_i, :] = [ 2. 6. 60. 66.]
643     cord_individual_obj[indivial_i, :] = [ 3. 6. 28. 34.]
644     cord_individual_obj[indivial_i, :] = [ 4. 5. 16. 21.]
645     cord_individual_obj[indivial_i, :] = [ 5. 5. 58. 63.]
646     cord_individual_obj[indivial_i, :] = [ 6. 5. 8. 13.]
647     cord_individual_obj[indivial_i, :] = [ 7. 6. 38. 44.]
648     cord_individual_obj[indivial_i, :] = [ 8. 5. 38. 43.]
649     cord_individual_obj[indivial_i, :] = [ 9. 5. 38. 43.]
650
651     min(cord_individual_obj[:, 3]) = 13.0
652     historl_G_best_iter[iter, 3] = 13.0
653 Begin iteration:
654
655 iter = 39
656     cord_individual_obj[indivial_i, :] = [ 0. 5. 38. 43.]
657     cord_individual_obj[indivial_i, :] = [ 1. 5. 46. 51.]
658     cord_individual_obj[indivial_i, :] = [ 2. 5. 8. 13.]
659     cord_individual_obj[indivial_i, :] = [ 3. 6. 32. 38.]
660     cord_individual_obj[indivial_i, :] = [ 4. 5. 42. 47.]
661     cord_individual_obj[indivial_i, :] = [ 5. 5. 46. 51.]
662     cord_individual_obj[indivial_i, :] = [ 6. 5. 76. 81.]
663     cord_individual_obj[indivial_i, :] = [ 7. 6. 32. 38.]
664     cord_individual_obj[indivial_i, :] = [ 8. 5. 12. 17.]
665     cord_individual_obj[indivial_i, :] = [ 9. 5. 50. 55.]
666
667     min(cord_individual_obj[:, 3]) = 13.0

```

```

668 historl_G_best_iter[iter, 3] = 13.0
669 Begin iteration:
670
671 iter = 40
672 cord_individual_obj[indivial_i, :] = [ 0. 5. 46. 51.]
673 cord_individual_obj[indivial_i, :] = [ 1. 4. 28. 32.]
674 cord_individual_obj[indivial_i, :] = [ 2. 5. 66. 71.]
675 cord_individual_obj[indivial_i, :] = [ 3. 5. 28. 33.]
676 cord_individual_obj[indivial_i, :] = [ 4. 5. 28. 33.]
677 cord_individual_obj[indivial_i, :] = [ 5. 5. 46. 51.]
678 cord_individual_obj[indivial_i, :] = [ 6. 5. 8. 13.]
679 cord_individual_obj[indivial_i, :] = [ 7. 5. 28. 33.]
680 cord_individual_obj[indivial_i, :] = [ 8. 5. 38. 43.]
681 cord_individual_obj[indivial_i, :] = [ 9. 5. 28. 33.]
682
683 min(cord_individual_obj[:, 3]) = 13.0
684 historl_G_best_iter[iter, 3] = 13.0
685 Iteration calculate over
686
687
688
689
690 All item are in Bin and:
691 Bin area = 1080
692 Real_area = 101.0
693 Proportion_of_area = 0.09351851851851851
694 BEST_CHROM =
695     berth: [ 2.5 26. 8. 13.5 17.5 21. ]
696     time: [0. 0. 0. 0. 0. ]
697     num_QC: [4. 2. 4. 3. 3. 2.]
698 Objective function values and some other indicators:
699 Obj0 = 5.00          Obj1 = 8.00          Obj0 + Obj1 = 13.00
700 Total movement of crane: 8.00
701 Total waiting time in berth position: 0.00
702 Total index of q during berthing: 648.00
703 Specific arrangement for each vessel:
704 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      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
705 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
706 V_id: 2      li: 6.0      xi: 8.0      bow of i: 5.0      tail of i: 11.0      gama_i0: 0.0      gama_i1: 3.0
    .           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
707 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      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
708 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      gama_i1 - gama_i0: 3.0      duration_time_i: 4.0      demand_i: 200.0      work
load_i: 200.0      work load gap_i: 0
709 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      gama_i1 - gama_i0: 5.0      duration_time_i: 6.0      demand_i: 220.0      work
load_i: 220.0      work load gap_i: 0
710
711 Algorithm finished and the total CPU time: 127 s
712 End
713

```