

unknown

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1 "E:\我的文件\3\我的项目\1\我的程序\1_LW_00002\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=9761
2
3 import sys; print('Python %s on %s' % (sys.version, sys.platform))
4 sys.path.extend(['E:\我的文件\3\我的项目\1\我的程序\1_LW_00002\6\2 python code\01_My_Python_Code', 'E:/1\我的项目\3\我的程序\1\我的程序\1_LW_00002\6\2 python code\01_My_Python_Code'])
5
6 PyDev console: starting.
7
8 Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
9 >>> runfile('E:/1\我的项目\3\我的程序\1\我的程序\1_LW_00002\6\2 python code\01_My_Python_Code\main_BACASP_offical_PSO_2D_Bin_berth_line.py', wdir='E:/1\我的项目\3\我的程序\1\我的程序\1_LW_00002\6\2 python code\01_My_Python_Code')
10 Backend TkAgg is interactive backend. Turning interactive mode on.
11 Waiting 1s.....
12
13 This is the R_6_1_standerd_test.xlsx optimization process.
14
15 Start
16     Read basic data
17         V = 6
18         T = 36
19         Q = 23
20         L = 30
21 PSO parameter setting:
22     Trail = 28
23     maxIter_num = 30
24     W_inertia = 0.5
25     oder_type_num = 10
26     c1 = 2.0
27     c2 = 2.5
28     r1 = 0.8776466698704714
29     r2 = 0.8776466698704714
30 Begin iteration:
31
32 iter = 0
33 cord_individual_obj[individual_i, :] = [ 0.  4. 50. 54.]
34 cord_individual_obj[individual_i, :] = [ 1.  6. 56. 62.]
35 cord_individual_obj[individual_i, :] = [ 2.  5. 156. 161.]
36 cord_individual_obj[individual_i, :] = [ 3.  4. 76. 80.]
37 cord_individual_obj[individual_i, :] = [ 4.  3. 62. 65.]
38 cord_individual_obj[individual_i, :] = [ 5.  4. 62. 66.]
39 cord_individual_obj[individual_i, :] = [ 6.  4. 100. 104.]
40 cord_individual_obj[individual_i, :] = [ 7.  4. 64. 68.]
41 cord_individual_obj[individual_i, :] = [ 8.  4. 40. 44.]
42 cord_individual_obj[individual_i, :] = [ 9.  5. 70. 75.]
43
44 min(cord_individual_obj[:, 3]) = 44.0
45 historl_G_best_iter[iter, 3] = 44.0
46 Begin iteration:
47
48 iter = 1
49 cord_individual_obj[individual_i, :] = [ 0.  4. 20. 24.]
50 cord_individual_obj[individual_i, :] = [ 1.  5. 18. 23.]
51 cord_individual_obj[individual_i, :] = [ 2.  4. 40. 44.]
52 cord_individual_obj[individual_i, :] = [ 3.  3. 46. 49.]
53 cord_individual_obj[individual_i, :] = [ 4.  5. 12. 17.]
54 cord_individual_obj[individual_i, :] = [ 5.  4. 28. 32.]
55 cord_individual_obj[individual_i, :] = [ 6.  5. 40. 45.]
56 cord_individual_obj[individual_i, :] = [ 7.  4. 18. 22.]
57 cord_individual_obj[individual_i, :] = [ 8.  5. 52. 57.]
58 cord_individual_obj[individual_i, :] = [ 9.  5. 44. 49.]
59
60 min(cord_individual_obj[:, 3]) = 17.0
61 historl_G_best_iter[iter, 3] = 17.0
62 Begin iteration:
63
64 iter = 2
65 cord_individual_obj[individual_i, :] = [ 0.  5. 22. 27.]
66 cord_individual_obj[individual_i, :] = [ 1.  5.  8. 13.]
67 cord_individual_obj[individual_i, :] = [ 2.  5. 12. 17.]
68 cord_individual_obj[individual_i, :] = [ 3.  5. 52. 57.]
69 cord_individual_obj[individual_i, :] = [ 4.  5. 22. 27.]
70 cord_individual_obj[individual_i, :] = [ 5.  5.  8. 13.]
71 cord_individual_obj[individual_i, :] = [ 6.  3. 42. 45.]
72 cord_individual_obj[individual_i, :] = [ 7.  5. 44. 49.]
73 cord_individual_obj[individual_i, :] = [ 8.  5. 12. 17.]
74 cord_individual_obj[individual_i, :] = [ 9.  5.  8. 13.]
75
76 min(cord_individual_obj[:, 3]) = 13.0
77 historl_G_best_iter[iter, 3] = 13.0
78 Begin iteration:
79

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80 iter = 3
81 cord_individual_obj[indivial_i, :] = [ 0. 5. 12. 17.]
82 cord_individual_obj[indivial_i, :] = [ 1. 5. 62. 67.]
83 cord_individual_obj[indivial_i, :] = [ 2. 4. 12. 16.]
84 cord_individual_obj[indivial_i, :] = [ 3. 5. 8. 13.]
85 cord_individual_obj[indivial_i, :] = [ 4. 4. 24. 28.]
86 cord_individual_obj[indivial_i, :] = [ 5. 5. 58. 63.]
87 cord_individual_obj[indivial_i, :] = [ 6. 3. 12. 15.]
88 cord_individual_obj[indivial_i, :] = [ 7. 5. 44. 49.]
89 cord_individual_obj[indivial_i, :] = [ 8. 5. 12. 17.]
90 cord_individual_obj[indivial_i, :] = [ 9. 4. 54. 58.]
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. 8. 13.]
98 cord_individual_obj[indivial_i, :] = [ 1. 5. 8. 13.]
99 cord_individual_obj[indivial_i, :] = [ 2. 5. 38. 43.]
100 cord_individual_obj[indivial_i, :] = [ 3. 5. 44. 49.]
101 cord_individual_obj[indivial_i, :] = [ 4. 4. 8. 12.]
102 cord_individual_obj[indivial_i, :] = [ 5. 5. 108. 113.]
103 cord_individual_obj[indivial_i, :] = [ 6. 5. 20. 25.]
104 cord_individual_obj[indivial_i, :] = [ 7. 5. 72. 77.]
105 cord_individual_obj[indivial_i, :] = [ 8. 4. 8. 12.]
106 cord_individual_obj[indivial_i, :] = [ 9. 5. 24. 29.]
107
108 min(cord_individual_obj[:, 3]) = 12.0
109 historl_G_best_iter[iter, 3] = 12.0
110 Begin iteration:
111
112 iter = 5
113 cord_individual_obj[indivial_i, :] = [ 0. 4. 8. 12.]
114 cord_individual_obj[indivial_i, :] = [ 1. 4. 62. 66.]
115 cord_individual_obj[indivial_i, :] = [ 2. 5. 8. 13.]
116 cord_individual_obj[indivial_i, :] = [ 3. 4. 100. 104.]
117 cord_individual_obj[indivial_i, :] = [ 4. 5. 16. 21.]
118 cord_individual_obj[indivial_i, :] = [ 5. 4. 8. 12.]
119 cord_individual_obj[indivial_i, :] = [ 6. 5. 8. 13.]
120 cord_individual_obj[indivial_i, :] = [ 7. 4. 24. 28.]
121 cord_individual_obj[indivial_i, :] = [ 8. 5. 8. 13.]
122 cord_individual_obj[indivial_i, :] = [ 9. 5. 94. 99.]
123
124 min(cord_individual_obj[:, 3]) = 12.0
125 historl_G_best_iter[iter, 3] = 12.0
126 Begin iteration:
127
128 iter = 6
129 cord_individual_obj[indivial_i, :] = [ 0. 4. 62. 66.]
130 cord_individual_obj[indivial_i, :] = [ 1. 4. 20. 24.]
131 cord_individual_obj[indivial_i, :] = [ 2. 5. 12. 17.]
132 cord_individual_obj[indivial_i, :] = [ 3. 4. 8. 12.]
133 cord_individual_obj[indivial_i, :] = [ 4. 5. 76. 81.]
134 cord_individual_obj[indivial_i, :] = [ 5. 3. 86. 89.]
135 cord_individual_obj[indivial_i, :] = [ 6. 5. 12. 17.]
136 cord_individual_obj[indivial_i, :] = [ 7. 4. 40. 44.]
137 cord_individual_obj[indivial_i, :] = [ 8. 5. 62. 67.]
138 cord_individual_obj[indivial_i, :] = [ 9. 5. 82. 87.]
139
140 min(cord_individual_obj[:, 3]) = 12.0
141 historl_G_best_iter[iter, 3] = 12.0
142 Begin iteration:
143
144 iter = 7
145 cord_individual_obj[indivial_i, :] = [ 0. 4. 76. 80.]
146 cord_individual_obj[indivial_i, :] = [ 1. 4. 76. 80.]
147 cord_individual_obj[indivial_i, :] = [ 2. 4. 88. 92.]
148 cord_individual_obj[indivial_i, :] = [ 3. 4. 62. 66.]
149 cord_individual_obj[indivial_i, :] = [ 4. 4. 62. 66.]
150 cord_individual_obj[indivial_i, :] = [ 5. 4. 8. 12.]
151 cord_individual_obj[indivial_i, :] = [ 6. 3. 130. 133.]
152 cord_individual_obj[indivial_i, :] = [ 7. 4. 68. 72.]
153 cord_individual_obj[indivial_i, :] = [ 8. 4. 94. 98.]
154 cord_individual_obj[indivial_i, :] = [ 9. 4. 36. 40.]
155
156 min(cord_individual_obj[:, 3]) = 12.0
157 historl_G_best_iter[iter, 3] = 12.0
158 Begin iteration:
159
160 iter = 8
161 cord_individual_obj[indivial_i, :] = [ 0. 4. 62. 66.]
162 cord_individual_obj[indivial_i, :] = [ 1. 4. 62. 66.]
163 cord_individual_obj[indivial_i, :] = [ 2. 5. 12. 17.]

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164 cord_individual_obj[indivial_i,:] = [ 3. 3. 102. 105.]
165 cord_individual_obj[indivial_i,:] = [ 4. 5. 76. 81.]
166 cord_individual_obj[indivial_i,:] = [ 5. 3. 44. 47.]
167 cord_individual_obj[indivial_i,:] = [ 6. 4. 8. 12.]
168 cord_individual_obj[indivial_i,:] = [ 7. 4. 20. 24.]
169 cord_individual_obj[indivial_i,:] = [ 8. 5. 62. 67.]
170 cord_individual_obj[indivial_i,:] = [ 9. 5. 82. 87.]
171
172 min(cord_individual_obj[:,3]) = 12.0
173 historl_G_best_iter[iter,3] = 12.0
174 Begin iteration:
175
176 iter = 9
177 cord_individual_obj[indivial_i,:] = [ 0. 4. 76. 80.]
178 cord_individual_obj[indivial_i,:] = [ 1. 4. 76. 80.]
179 cord_individual_obj[indivial_i,:] = [ 2. 4. 82. 86.]
180 cord_individual_obj[indivial_i,:] = [ 3. 4. 8. 12.]
181 cord_individual_obj[indivial_i,:] = [ 4. 4. 62. 66.]
182 cord_individual_obj[indivial_i,:] = [ 5. 3. 86. 89.]
183 cord_individual_obj[indivial_i,:] = [ 6. 5. 76. 81.]
184 cord_individual_obj[indivial_i,:] = [ 7. 4. 82. 86.]
185 cord_individual_obj[indivial_i,:] = [ 8. 4. 76. 80.]
186 cord_individual_obj[indivial_i,:] = [ 9. 4. 62. 66.]
187
188 min(cord_individual_obj[:,3]) = 12.0
189 historl_G_best_iter[iter,3] = 12.0
190 Begin iteration:
191
192 iter = 10
193 cord_individual_obj[indivial_i,:] = [ 0. 4. 62. 66.]
194 cord_individual_obj[indivial_i,:] = [ 1. 4. 62. 66.]
195 cord_individual_obj[indivial_i,:] = [ 2. 5. 36. 41.]
196 cord_individual_obj[indivial_i,:] = [ 3. 4. 62. 66.]
197 cord_individual_obj[indivial_i,:] = [ 4. 5. 76. 81.]
198 cord_individual_obj[indivial_i,:] = [ 5. 4. 8. 12.]
199 cord_individual_obj[indivial_i,:] = [ 6. 5. 86. 91.]
200 cord_individual_obj[indivial_i,:] = [ 7. 4. 36. 40.]
201 cord_individual_obj[indivial_i,:] = [ 8. 5. 76. 81.]
202 cord_individual_obj[indivial_i,:] = [ 9. 5. 98. 103.]
203
204 min(cord_individual_obj[:,3]) = 12.0
205 historl_G_best_iter[iter,3] = 12.0
206 Begin iteration:
207
208 iter = 11
209 cord_individual_obj[indivial_i,:] = [ 0. 4. 76. 80.]
210 cord_individual_obj[indivial_i,:] = [ 1. 4. 76. 80.]
211 cord_individual_obj[indivial_i,:] = [ 2. 4. 76. 80.]
212 cord_individual_obj[indivial_i,:] = [ 3. 3. 68. 71.]
213 cord_individual_obj[indivial_i,:] = [ 4. 4. 62. 66.]
214 cord_individual_obj[indivial_i,:] = [ 5. 3. 44. 47.]
215 cord_individual_obj[indivial_i,:] = [ 6. 3. 86. 89.]
216 cord_individual_obj[indivial_i,:] = [ 7. 4. 76. 80.]
217 cord_individual_obj[indivial_i,:] = [ 8. 4. 76. 80.]
218 cord_individual_obj[indivial_i,:] = [ 9. 4. 8. 12.]
219
220 min(cord_individual_obj[:,3]) = 12.0
221 historl_G_best_iter[iter,3] = 12.0
222 Begin iteration:
223
224 iter = 12
225 cord_individual_obj[indivial_i,:] = [ 0. 4. 62. 66.]
226 cord_individual_obj[indivial_i,:] = [ 1. 4. 62. 66.]
227 cord_individual_obj[indivial_i,:] = [ 2. 5. 36. 41.]
228 cord_individual_obj[indivial_i,:] = [ 3. 4. 62. 66.]
229 cord_individual_obj[indivial_i,:] = [ 4. 5. 62. 67.]
230 cord_individual_obj[indivial_i,:] = [ 5. 3. 70. 73.]
231 cord_individual_obj[indivial_i,:] = [ 6. 4. 8. 12.]
232 cord_individual_obj[indivial_i,:] = [ 7. 4. 36. 40.]
233 cord_individual_obj[indivial_i,:] = [ 8. 5. 76. 81.]
234 cord_individual_obj[indivial_i,:] = [ 9. 5. 88. 93.]
235
236 min(cord_individual_obj[:,3]) = 12.0
237 historl_G_best_iter[iter,3] = 12.0
238 Begin iteration:
239
240 iter = 13
241 cord_individual_obj[indivial_i,:] = [ 0. 4. 82. 86.]
242 cord_individual_obj[indivial_i,:] = [ 1. 4. 12. 16.]
243 cord_individual_obj[indivial_i,:] = [ 2. 4. 24. 28.]
244 cord_individual_obj[indivial_i,:] = [ 3. 4. 36. 40.]
245 cord_individual_obj[indivial_i,:] = [ 4. 4. 8. 12.]
246 cord_individual_obj[indivial_i,:] = [ 5. 4. 56. 60.]
247 cord_individual_obj[indivial_i,:] = [ 6. 5. 76. 81.]

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248     cord_individual_obj[indivial_i, :] = [ 7. 4. 36. 40.]
249     cord_individual_obj[indivial_i, :] = [ 8. 4. 84. 88.]
250     cord_individual_obj[indivial_i, :] = [ 9. 4. 8. 12.]
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. 4. 30. 34.]
258     cord_individual_obj[indivial_i, :] = [ 1. 4. 46. 50.]
259     cord_individual_obj[indivial_i, :] = [ 2. 5. 48. 53.]
260     cord_individual_obj[indivial_i, :] = [ 3. 3. 54. 57.]
261     cord_individual_obj[indivial_i, :] = [ 4. 5. 36. 41.]
262     cord_individual_obj[indivial_i, :] = [ 5. 4. 86. 90.]
263     cord_individual_obj[indivial_i, :] = [ 6. 4. 82. 86.]
264     cord_individual_obj[indivial_i, :] = [ 7. 4. 82. 86.]
265     cord_individual_obj[indivial_i, :] = [ 8. 4. 8. 12.]
266     cord_individual_obj[indivial_i, :] = [ 9. 5. 30. 35.]
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. 4. 24. 28.]
274     cord_individual_obj[indivial_i, :] = [ 1. 4. 38. 42.]
275     cord_individual_obj[indivial_i, :] = [ 2. 5. 94. 99.]
276     cord_individual_obj[indivial_i, :] = [ 3. 4. 54. 58.]
277     cord_individual_obj[indivial_i, :] = [ 4. 4. 78. 82.]
278     cord_individual_obj[indivial_i, :] = [ 5. 4. 8. 12.]
279     cord_individual_obj[indivial_i, :] = [ 6. 5. 76. 81.]
280     cord_individual_obj[indivial_i, :] = [ 7. 4. 38. 42.]
281     cord_individual_obj[indivial_i, :] = [ 8. 5. 62. 67.]
282     cord_individual_obj[indivial_i, :] = [ 9. 5. 24. 29.]
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. 66. 70.]
290     cord_individual_obj[indivial_i, :] = [ 1. 4. 28. 32.]
291     cord_individual_obj[indivial_i, :] = [ 2. 4. 8. 12.]
292     cord_individual_obj[indivial_i, :] = [ 3. 4. 126. 130.]
293     cord_individual_obj[indivial_i, :] = [ 4. 4. 36. 40.]
294     cord_individual_obj[indivial_i, :] = [ 5. 4. 30. 34.]
295     cord_individual_obj[indivial_i, :] = [ 6. 5. 62. 67.]
296     cord_individual_obj[indivial_i, :] = [ 7. 4. 28. 32.]
297     cord_individual_obj[indivial_i, :] = [ 8. 5. 58. 63.]
298     cord_individual_obj[indivial_i, :] = [ 9. 5. 32. 37.]
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. 4. 32. 36.]
306     cord_individual_obj[indivial_i, :] = [ 1. 4. 104. 108.]
307     cord_individual_obj[indivial_i, :] = [ 2. 5. 20. 25.]
308     cord_individual_obj[indivial_i, :] = [ 3. 4. 8. 12.]
309     cord_individual_obj[indivial_i, :] = [ 4. 5. 56. 61.]
310     cord_individual_obj[indivial_i, :] = [ 5. 4. 68. 72.]
311     cord_individual_obj[indivial_i, :] = [ 6. 4. 56. 60.]
312     cord_individual_obj[indivial_i, :] = [ 7. 4. 54. 58.]
313     cord_individual_obj[indivial_i, :] = [ 8. 4. 62. 66.]
314     cord_individual_obj[indivial_i, :] = [ 9. 3. 138. 141.]
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. 68. 72.]
322     cord_individual_obj[indivial_i, :] = [ 1. 4. 30. 34.]
323     cord_individual_obj[indivial_i, :] = [ 2. 4. 68. 72.]
324     cord_individual_obj[indivial_i, :] = [ 3. 4. 36. 40.]
325     cord_individual_obj[indivial_i, :] = [ 4. 4. 36. 40.]
326     cord_individual_obj[indivial_i, :] = [ 5. 3. 50. 53.]
327     cord_individual_obj[indivial_i, :] = [ 6. 5. 62. 67.]
328     cord_individual_obj[indivial_i, :] = [ 7. 4. 20. 24.]
329     cord_individual_obj[indivial_i, :] = [ 8. 5. 76. 81.]
330     cord_individual_obj[indivial_i, :] = [ 9. 4. 8. 12.]
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. 64. 68.]
338 cord_individual_obj[indivial_i, :] = [ 1. 4. 64. 68.]
339 cord_individual_obj[indivial_i, :] = [ 2. 5. 36. 41.]
340 cord_individual_obj[indivial_i, :] = [ 3. 4. 44. 48.]
341 cord_individual_obj[indivial_i, :] = [ 4. 5. 32. 37.]
342 cord_individual_obj[indivial_i, :] = [ 5. 4. 24. 28.]
343 cord_individual_obj[indivial_i, :] = [ 6. 4. 84. 88.]
344 cord_individual_obj[indivial_i, :] = [ 7. 4. 56. 60.]
345 cord_individual_obj[indivial_i, :] = [ 8. 4. 8. 12.]
346 cord_individual_obj[indivial_i, :] = [ 9. 5. 30. 35.]
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. 62. 66.]
354 cord_individual_obj[indivial_i, :] = [ 1. 4. 68. 72.]
355 cord_individual_obj[indivial_i, :] = [ 2. 4. 78. 82.]
356 cord_individual_obj[indivial_i, :] = [ 3. 4. 74. 78.]
357 cord_individual_obj[indivial_i, :] = [ 4. 4. 56. 60.]
358 cord_individual_obj[indivial_i, :] = [ 5. 4. 58. 62.]
359 cord_individual_obj[indivial_i, :] = [ 6. 4. 8. 12.]
360 cord_individual_obj[indivial_i, :] = [ 7. 4. 110. 114.]
361 cord_individual_obj[indivial_i, :] = [ 8. 5. 62. 67.]
362 cord_individual_obj[indivial_i, :] = [ 9. 4. 56. 60.]
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. 36. 40.]
370 cord_individual_obj[indivial_i, :] = [ 1. 4. 30. 34.]
371 cord_individual_obj[indivial_i, :] = [ 2. 5. 20. 25.]
372 cord_individual_obj[indivial_i, :] = [ 3. 4. 36. 40.]
373 cord_individual_obj[indivial_i, :] = [ 4. 5. 36. 41.]
374 cord_individual_obj[indivial_i, :] = [ 5. 3. 80. 83.]
375 cord_individual_obj[indivial_i, :] = [ 6. 5. 62. 67.]
376 cord_individual_obj[indivial_i, :] = [ 7. 4. 8. 12.]
377 cord_individual_obj[indivial_i, :] = [ 8. 5. 62. 67.]
378 cord_individual_obj[indivial_i, :] = [ 9. 5. 48. 53.]
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. 36. 40.]
386 cord_individual_obj[indivial_i, :] = [ 1. 4. 42. 46.]
387 cord_individual_obj[indivial_i, :] = [ 2. 5. 20. 25.]
388 cord_individual_obj[indivial_i, :] = [ 3. 3. 44. 47.]
389 cord_individual_obj[indivial_i, :] = [ 4. 5. 36. 41.]
390 cord_individual_obj[indivial_i, :] = [ 5. 4. 8. 12.]
391 cord_individual_obj[indivial_i, :] = [ 6. 5. 62. 67.]
392 cord_individual_obj[indivial_i, :] = [ 7. 4. 20. 24.]
393 cord_individual_obj[indivial_i, :] = [ 8. 5. 62. 67.]
394 cord_individual_obj[indivial_i, :] = [ 9. 4. 36. 40.]
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. 36. 40.]
402 cord_individual_obj[indivial_i, :] = [ 1. 4. 30. 34.]
403 cord_individual_obj[indivial_i, :] = [ 2. 5. 20. 25.]
404 cord_individual_obj[indivial_i, :] = [ 3. 3. 54. 57.]
405 cord_individual_obj[indivial_i, :] = [ 4. 5. 36. 41.]
406 cord_individual_obj[indivial_i, :] = [ 5. 4. 30. 34.]
407 cord_individual_obj[indivial_i, :] = [ 6. 4. 8. 12.]
408 cord_individual_obj[indivial_i, :] = [ 7. 4. 20. 24.]
409 cord_individual_obj[indivial_i, :] = [ 8. 5. 62. 67.]
410 cord_individual_obj[indivial_i, :] = [ 9. 5. 60. 65.]
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. 82. 86.]
418 cord_individual_obj[indivial_i, :] = [ 1. 4. 68. 72.]
419 cord_individual_obj[indivial_i, :] = [ 2. 4. 82. 86.]
420 cord_individual_obj[indivial_i, :] = [ 3. 3. 94. 97.]
421 cord_individual_obj[indivial_i, :] = [ 4. 4. 82. 86.]
422 cord_individual_obj[indivial_i, :] = [ 5. 3. 78. 81.]
423 cord_individual_obj[indivial_i, :] = [ 6. 5. 72. 77.]
424 cord_individual_obj[indivial_i, :] = [ 7. 4. 56. 60.]
425 cord_individual_obj[indivial_i, :] = [ 8. 4. 8. 12.]
426 cord_individual_obj[indivial_i, :] = [ 9. 3. 84. 87.]
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. 36. 40.]
434 cord_individual_obj[indivial_i, :] = [ 1. 4. 30. 34.]
435 cord_individual_obj[indivial_i, :] = [ 2. 5. 20. 25.]
436 cord_individual_obj[indivial_i, :] = [ 3. 4. 8. 12.]
437 cord_individual_obj[indivial_i, :] = [ 4. 5. 36. 41.]
438 cord_individual_obj[indivial_i, :] = [ 5. 3. 44. 47.]
439 cord_individual_obj[indivial_i, :] = [ 6. 5. 62. 67.]
440 cord_individual_obj[indivial_i, :] = [ 7. 4. 20. 24.]
441 cord_individual_obj[indivial_i, :] = [ 8. 5. 62. 67.]
442 cord_individual_obj[indivial_i, :] = [ 9. 5. 44. 49.]
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. 32. 36.]
450 cord_individual_obj[indivial_i, :] = [ 1. 4. 36. 40.]
451 cord_individual_obj[indivial_i, :] = [ 2. 5. 36. 41.]
452 cord_individual_obj[indivial_i, :] = [ 3. 4. 36. 40.]
453 cord_individual_obj[indivial_i, :] = [ 4. 5. 36. 41.]
454 cord_individual_obj[indivial_i, :] = [ 5. 4. 30. 34.]
455 cord_individual_obj[indivial_i, :] = [ 6. 4. 8. 12.]
456 cord_individual_obj[indivial_i, :] = [ 7. 4. 28. 32.]
457 cord_individual_obj[indivial_i, :] = [ 8. 5. 58. 63.]
458 cord_individual_obj[indivial_i, :] = [ 9. 5. 36. 41.]
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. 56. 60.]
466 cord_individual_obj[indivial_i, :] = [ 1. 4. 56. 60.]
467 cord_individual_obj[indivial_i, :] = [ 2. 4. 82. 86.]
468 cord_individual_obj[indivial_i, :] = [ 3. 4. 84. 88.]
469 cord_individual_obj[indivial_i, :] = [ 4. 4. 86. 90.]
470 cord_individual_obj[indivial_i, :] = [ 5. 4. 62. 66.]
471 cord_individual_obj[indivial_i, :] = [ 6. 5. 72. 77.]
472 cord_individual_obj[indivial_i, :] = [ 7. 4. 116. 120.]
473 cord_individual_obj[indivial_i, :] = [ 8. 4. 8. 12.]
474 cord_individual_obj[indivial_i, :] = [ 9. 4. 86. 90.]
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. 36. 40.]
482 cord_individual_obj[indivial_i, :] = [ 1. 4. 30. 34.]
483 cord_individual_obj[indivial_i, :] = [ 2. 4. 20. 24.]
484 cord_individual_obj[indivial_i, :] = [ 3. 4. 36. 40.]
485 cord_individual_obj[indivial_i, :] = [ 4. 5. 36. 41.]
486 cord_individual_obj[indivial_i, :] = [ 5. 3. 50. 53.]
487 cord_individual_obj[indivial_i, :] = [ 6. 5. 62. 67.]
488 cord_individual_obj[indivial_i, :] = [ 7. 4. 8. 12.]
489 cord_individual_obj[indivial_i, :] = [ 8. 5. 62. 67.]
490 cord_individual_obj[indivial_i, :] = [ 9. 4. 30. 34.]
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. 36. 40.]
498 cord_individual_obj[indivial_i, :] = [ 1. 4. 66. 70.]
499 cord_individual_obj[indivial_i, :] = [ 2. 5. 20. 25.]

```

```

500 cord_individual_obj[indivial_i, :] = [ 3. 4. 36. 40.]
501 cord_individual_obj[indivial_i, :] = [ 4. 5. 56. 61.]
502 cord_individual_obj[indivial_i, :] = [ 5. 4. 30. 34.]
503 cord_individual_obj[indivial_i, :] = [ 6. 4. 8. 12.]
504 cord_individual_obj[indivial_i, :] = [ 7. 4. 20. 24.]
505 cord_individual_obj[indivial_i, :] = [ 8. 4. 62. 66.]
506 cord_individual_obj[indivial_i, :] = [ 9. 5. 78. 83.]
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. 68. 72.]
514 cord_individual_obj[indivial_i, :] = [ 1. 4. 36. 40.]
515 cord_individual_obj[indivial_i, :] = [ 2. 4. 68. 72.]
516 cord_individual_obj[indivial_i, :] = [ 3. 3. 98. 101.]
517 cord_individual_obj[indivial_i, :] = [ 4. 4. 36. 40.]
518 cord_individual_obj[indivial_i, :] = [ 5. 3. 84. 87.]
519 cord_individual_obj[indivial_i, :] = [ 6. 5. 62. 67.]
520 cord_individual_obj[indivial_i, :] = [ 7. 4. 68. 72.]
521 cord_individual_obj[indivial_i, :] = [ 8. 5. 76. 81.]
522 cord_individual_obj[indivial_i, :] = [ 9. 4. 8. 12.]
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 = 87.0
534 Proportion_of_area = 0.08055555555555556
535 BEST_CHROM =
536     berth: [ 2.5 26. 8. 20.5 12.5 16. ]
537     time: [0. 0. 0. 0. 0. ]
538     num_QC: [3. 2. 5. 3. 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: 574.00
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: 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:
546
      80.0           work load gap_i: 0
      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
      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: 2.0
      .               gama_i1 + 1: 3.0           .               gama_i1 - gama_i0: 2.0           duration_time_i: 3.0           demand_i: 260.0           work load_i:
      260.0           work load gap_i: 0
      V_id: 3           li: 5.0           xi: 20.5           bow of i: 18.0           tail of i: 23.0           gama_i0: 0.0           gama_i1: 1
      .               gama_i1 + 1: 2.0           .               gama_i1 - gama_i0: 1.0           duration_time_i: 2.0           demand_i: 80.0           work
      load_i: 80.0           work load gap_i: 0
      V_id: 4           li: 3.0           xi: 12.5           bow of i: 11.0           tail of i: 14.0           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
      V_id: 5           li: 4.0           xi: 16.0           bow of i: 14.0           tail of i: 18.0           gama_i0: 0.0           gama_i1: 3
      .               gama_i1 + 1: 4.0           .               gama_i1 - gama_i0: 3.0           duration_time_i: 4.0           demand_i: 220.0           work
      load_i: 220.0           work load gap_i: 0
551
552 Algorithm finished and the total CPU time: 147 s
553 End
554

```