

unknown

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1 "E:\我的云盘\3 项目\1 项目\1 项目\1_LW_00002\6 0000\2 python code\01_My_Python_Code\Scripts\python.exe" "D:\Python\Pycharm\setrouted\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=55005
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_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 = 20
23         maxIter_num = 30
24         W_inertia = 1.0
25         oder_type_num = 15
26         c1 = 1.5
27         c2 = 1.0
28         r1 = 0.08367208706028928
29         r2 = 0.08367208706028928
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. 80. 83.]
39     cord_individual_obj[individual_i, :] = [ 6.  3. 158. 161.]
40     cord_individual_obj[individual_i, :] = [ 7.  3. 88. 91.]
41     cord_individual_obj[individual_i, :] = [ 8.  3. 72. 75.]
42     cord_individual_obj[individual_i, :] = [ 9.  3. 90. 93.]
43     cord_individual_obj[individual_i, :] = [ 10. 3. 114. 117.]
44     cord_individual_obj[individual_i, :] = [ 11. 3. 156. 159.]
45     cord_individual_obj[individual_i, :] = [ 12. 3. 114. 117.]
46     cord_individual_obj[individual_i, :] = [ 13. 3. 150. 153.]
47     cord_individual_obj[individual_i, :] = [ 14. 3. 138. 141.]
48
49 min(cord_individual_obj[:, 3]) = 75.0
50 historl_G_best_iter[iter, 3] = 75.0
51 Begin iteration:
52
53 iter = 1
54     cord_individual_obj[individual_i, :] = [ 0.  4. 78. 82.]
55     cord_individual_obj[individual_i, :] = [ 1.  3. 72. 75.]
56     cord_individual_obj[individual_i, :] = [ 2.  4. 78. 82.]
57     cord_individual_obj[individual_i, :] = [ 3.  4. 94. 98.]
58     cord_individual_obj[individual_i, :] = [ 4.  4. 36. 40.]
59     cord_individual_obj[individual_i, :] = [ 5.  4. 106. 110.]
60     cord_individual_obj[individual_i, :] = [ 6.  4. 54. 58.]
61     cord_individual_obj[individual_i, :] = [ 7.  3. 58. 61.]
62     cord_individual_obj[individual_i, :] = [ 8.  4. 56. 60.]
63     cord_individual_obj[individual_i, :] = [ 9.  3. 64. 67.]
64     cord_individual_obj[individual_i, :] = [ 10. 3. 74. 77.]
65     cord_individual_obj[individual_i, :] = [ 11. 4. 30. 34.]
66     cord_individual_obj[individual_i, :] = [ 12. 4. 64. 68.]
67     cord_individual_obj[individual_i, :] = [ 13. 4. 54. 58.]
68     cord_individual_obj[individual_i, :] = [ 14. 4. 54. 58.]
69
70 min(cord_individual_obj[:, 3]) = 34.0
71 historl_G_best_iter[iter, 3] = 34.0
72 Begin iteration:
73
74 iter = 2
75     cord_individual_obj[individual_i, :] = [ 0.  6. 92. 98.]
76     cord_individual_obj[individual_i, :] = [ 1.  6. 8. 14.]
77     cord_individual_obj[individual_i, :] = [ 2.  6. 24. 30.]
78     cord_individual_obj[individual_i, :] = [ 3.  6. 8. 14.]
79     cord_individual_obj[individual_i, :] = [ 4.  6. 24. 30.]

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80  cord_individual_obj[indivial_i,:] = [ 5. 4. 30. 34.]
81  cord_individual_obj[indivial_i,:] = [ 6. 6. 8. 14.]
82  cord_individual_obj[indivial_i,:] = [ 7. 4. 18. 22.]
83  cord_individual_obj[indivial_i,:] = [ 8. 6. 14. 20.]
84  cord_individual_obj[indivial_i,:] = [ 9. 5. 40. 45.]
85  cord_individual_obj[indivial_i,:] = [10. 3. 32. 35.]
86  cord_individual_obj[indivial_i,:] = [11. 6. 8. 14.]
87  cord_individual_obj[indivial_i,:] = [12. 6. 8. 14.]
88  cord_individual_obj[indivial_i,:] = [13. 4. 34. 38.]
89  cord_individual_obj[indivial_i,:] = [14. 6. 8. 14.]
90
91 min(cord_individual_obj[:,3]) = 14.0
92 historl_G_best_iter[iter,3] = 14.0
93 Begin iteration:
94
95 iter = 3
96  cord_individual_obj[indivial_i,:] = [ 0. 6. 8. 14.]
97  cord_individual_obj[indivial_i,:] = [ 1. 3. 48. 51.]
98  cord_individual_obj[indivial_i,:] = [ 2. 3. 44. 47.]
99  cord_individual_obj[indivial_i,:] = [ 3. 6. 18. 24.]
100 cord_individual_obj[indivial_i,:] = [ 4. 4. 52. 56.]
101 cord_individual_obj[indivial_i,:] = [ 5. 3. 12. 15.]
102 cord_individual_obj[indivial_i,:] = [ 6. 6. 48. 54.]
103 cord_individual_obj[indivial_i,:] = [ 7. 6. 12. 18.]
104 cord_individual_obj[indivial_i,:] = [ 8. 4. 54. 58.]
105 cord_individual_obj[indivial_i,:] = [ 9. 6. 12. 18.]
106 cord_individual_obj[indivial_i,:] = [10. 4. 12. 16.]
107 cord_individual_obj[indivial_i,:] = [11. 4. 44. 48.]
108 cord_individual_obj[indivial_i,:] = [12. 3. 12. 15.]
109 cord_individual_obj[indivial_i,:] = [13. 6. 12. 18.]
110 cord_individual_obj[indivial_i,:] = [14. 4. 58. 62.]
111
112 min(cord_individual_obj[:,3]) = 14.0
113 historl_G_best_iter[iter,3] = 14.0
114 Begin iteration:
115
116 iter = 4
117  cord_individual_obj[indivial_i,:] = [ 0. 6. 68. 74.]
118  cord_individual_obj[indivial_i,:] = [ 1. 4. 18. 22.]
119  cord_individual_obj[indivial_i,:] = [ 2. 4. 44. 48.]
120  cord_individual_obj[indivial_i,:] = [ 3. 6. 16. 22.]
121  cord_individual_obj[indivial_i,:] = [ 4. 6. 92. 98.]
122  cord_individual_obj[indivial_i,:] = [ 5. 5. 12. 17.]
123  cord_individual_obj[indivial_i,:] = [ 6. 6. 24. 30.]
124  cord_individual_obj[indivial_i,:] = [ 7. 6. 44. 50.]
125  cord_individual_obj[indivial_i,:] = [ 8. 6. 12. 18.]
126  cord_individual_obj[indivial_i,:] = [ 9. 6. 32. 38.]
127  cord_individual_obj[indivial_i,:] = [10. 4. 24. 28.]
128  cord_individual_obj[indivial_i,:] = [11. 6. 24. 30.]
129  cord_individual_obj[indivial_i,:] = [12. 6. 8. 14.]
130  cord_individual_obj[indivial_i,:] = [13. 6. 24. 30.]
131  cord_individual_obj[indivial_i,:] = [14. 6. 8. 14.]
132
133 min(cord_individual_obj[:,3]) = 14.0
134 historl_G_best_iter[iter,3] = 14.0
135 Begin iteration:
136
137 iter = 5
138  cord_individual_obj[indivial_i,:] = [ 0. 6. 8. 14.]
139  cord_individual_obj[indivial_i,:] = [ 1. 3. 128. 131.]
140  cord_individual_obj[indivial_i,:] = [ 2. 3. 50. 53.]
141  cord_individual_obj[indivial_i,:] = [ 3. 5. 68. 73.]
142  cord_individual_obj[indivial_i,:] = [ 4. 6. 8. 14.]
143  cord_individual_obj[indivial_i,:] = [ 5. 6. 8. 14.]
144  cord_individual_obj[indivial_i,:] = [ 6. 6. 8. 14.]
145  cord_individual_obj[indivial_i,:] = [ 7. 6. 12. 18.]
146  cord_individual_obj[indivial_i,:] = [ 8. 5. 36. 41.]
147  cord_individual_obj[indivial_i,:] = [ 9. 6. 8. 14.]
148  cord_individual_obj[indivial_i,:] = [10. 4. 18. 22.]
149  cord_individual_obj[indivial_i,:] = [11. 4. 24. 28.]
150  cord_individual_obj[indivial_i,:] = [12. 5. 18. 23.]
151  cord_individual_obj[indivial_i,:] = [13. 6. 8. 14.]
152  cord_individual_obj[indivial_i,:] = [14. 5. 44. 49.]
153
154 min(cord_individual_obj[:,3]) = 14.0
155 historl_G_best_iter[iter,3] = 14.0
156 Begin iteration:
157
158 iter = 6
159  cord_individual_obj[indivial_i,:] = [ 0. 4. 12. 16.]
160  cord_individual_obj[indivial_i,:] = [ 1. 6. 8. 14.]
161  cord_individual_obj[indivial_i,:] = [ 2. 4. 28. 32.]
162  cord_individual_obj[indivial_i,:] = [ 3. 6. 54. 60.]
163  cord_individual_obj[indivial_i,:] = [ 4. 4. 12. 16.]

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164 cord_individual_obj[indivial_i, :] = [ 5. 4. 30. 34.]
165 cord_individual_obj[indivial_i, :] = [ 6. 4. 30. 34.]
166 cord_individual_obj[indivial_i, :] = [ 7. 6. 38. 44.]
167 cord_individual_obj[indivial_i, :] = [ 8. 6. 12. 18.]
168 cord_individual_obj[indivial_i, :] = [ 9. 6. 12. 18.]
169 cord_individual_obj[indivial_i, :] = [10. 4. 24. 28.]
170 cord_individual_obj[indivial_i, :] = [11. 6. 12. 18.]
171 cord_individual_obj[indivial_i, :] = [12. 4. 30. 34.]
172 cord_individual_obj[indivial_i, :] = [13. 6. 12. 18.]
173 cord_individual_obj[indivial_i, :] = [14. 5. 20. 25.]
174
175 min(cord_individual_obj[:, 3]) = 14.0
176 historl_G_best_iter[iter, 3] = 14.0
177 Begin iteration:
178
179 iter = 7
180 cord_individual_obj[indivial_i, :] = [ 0. 4. 84. 88.]
181 cord_individual_obj[indivial_i, :] = [ 1. 6. 12. 18.]
182 cord_individual_obj[indivial_i, :] = [ 2. 6. 44. 50.]
183 cord_individual_obj[indivial_i, :] = [ 3. 6. 8. 14.]
184 cord_individual_obj[indivial_i, :] = [ 4. 6. 36. 42.]
185 cord_individual_obj[indivial_i, :] = [ 5. 4. 44. 48.]
186 cord_individual_obj[indivial_i, :] = [ 6. 6. 50. 56.]
187 cord_individual_obj[indivial_i, :] = [ 7. 6. 68. 74.]
188 cord_individual_obj[indivial_i, :] = [ 8. 4. 48. 52.]
189 cord_individual_obj[indivial_i, :] = [ 9. 6. 12. 18.]
190 cord_individual_obj[indivial_i, :] = [10. 4. 70. 74.]
191 cord_individual_obj[indivial_i, :] = [11. 4. 12. 16.]
192 cord_individual_obj[indivial_i, :] = [12. 6. 30. 36.]
193 cord_individual_obj[indivial_i, :] = [13. 6. 56. 62.]
194 cord_individual_obj[indivial_i, :] = [14. 5. 12. 17.]
195
196 min(cord_individual_obj[:, 3]) = 14.0
197 historl_G_best_iter[iter, 3] = 14.0
198 Begin iteration:
199
200 iter = 8
201 cord_individual_obj[indivial_i, :] = [ 0. 6. 8. 14.]
202 cord_individual_obj[indivial_i, :] = [ 1. 4. 92. 96.]
203 cord_individual_obj[indivial_i, :] = [ 2. 4. 92. 96.]
204 cord_individual_obj[indivial_i, :] = [ 3. 4. 38. 42.]
205 cord_individual_obj[indivial_i, :] = [ 4. 6. 80. 86.]
206 cord_individual_obj[indivial_i, :] = [ 5. 6. 24. 30.]
207 cord_individual_obj[indivial_i, :] = [ 6. 4. 60. 64.]
208 cord_individual_obj[indivial_i, :] = [ 7. 6. 82. 88.]
209 cord_individual_obj[indivial_i, :] = [ 8. 5. 28. 33.]
210 cord_individual_obj[indivial_i, :] = [ 9. 6. 12. 18.]
211 cord_individual_obj[indivial_i, :] = [10. 4. 82. 86.]
212 cord_individual_obj[indivial_i, :] = [11. 4. 92. 96.]
213 cord_individual_obj[indivial_i, :] = [12. 6. 8. 14.]
214 cord_individual_obj[indivial_i, :] = [13. 6. 60. 66.]
215 cord_individual_obj[indivial_i, :] = [14. 6. 64. 70.]
216
217 min(cord_individual_obj[:, 3]) = 14.0
218 historl_G_best_iter[iter, 3] = 14.0
219 Begin iteration:
220
221 iter = 9
222 cord_individual_obj[indivial_i, :] = [ 0. 3. 12. 15.]
223 cord_individual_obj[indivial_i, :] = [ 1. 6. 8. 14.]
224 cord_individual_obj[indivial_i, :] = [ 2. 4. 92. 96.]
225 cord_individual_obj[indivial_i, :] = [ 3. 6. 24. 30.]
226 cord_individual_obj[indivial_i, :] = [ 4. 4. 98. 102.]
227 cord_individual_obj[indivial_i, :] = [ 5. 5. 32. 37.]
228 cord_individual_obj[indivial_i, :] = [ 6. 6. 90. 96.]
229 cord_individual_obj[indivial_i, :] = [ 7. 6. 62. 68.]
230 cord_individual_obj[indivial_i, :] = [ 8. 5. 44. 49.]
231 cord_individual_obj[indivial_i, :] = [ 9. 6. 8. 14.]
232 cord_individual_obj[indivial_i, :] = [10. 4. 94. 98.]
233 cord_individual_obj[indivial_i, :] = [11. 6. 138. 144.]
234 cord_individual_obj[indivial_i, :] = [12. 5. 44. 49.]
235 cord_individual_obj[indivial_i, :] = [13. 6. 24. 30.]
236 cord_individual_obj[indivial_i, :] = [14. 6. 46. 52.]
237
238 min(cord_individual_obj[:, 3]) = 14.0
239 historl_G_best_iter[iter, 3] = 14.0
240 Begin iteration:
241
242 iter = 10
243 cord_individual_obj[indivial_i, :] = [ 0. 4. 62. 66.]
244 cord_individual_obj[indivial_i, :] = [ 1. 4. 12. 16.]
245 cord_individual_obj[indivial_i, :] = [ 2. 6. 92. 98.]
246 cord_individual_obj[indivial_i, :] = [ 3. 4. 70. 74.]
247 cord_individual_obj[indivial_i, :] = [ 4. 4. 68. 72.]

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248 cord_individual_obj[indivial_i,:] = [ 5. 5. 38. 43.]
249 cord_individual_obj[indivial_i,:] = [ 6. 4. 36. 40.]
250 cord_individual_obj[indivial_i,:] = [ 7. 6. 62. 68.]
251 cord_individual_obj[indivial_i,:] = [ 8. 5. 30. 35.]
252 cord_individual_obj[indivial_i,:] = [ 9. 6. 20. 26.]
253 cord_individual_obj[indivial_i,:] = [10. 4. 86. 90.]
254 cord_individual_obj[indivial_i,:] = [11. 6. 8. 14.]
255 cord_individual_obj[indivial_i,:] = [12. 6. 8. 14.]
256 cord_individual_obj[indivial_i,:] = [13. 6. 80. 86.]
257 cord_individual_obj[indivial_i,:] = [14. 6. 12. 18.]
258
259 min(cord_individual_obj[:,3]) = 14.0
260 historl_G_best_iter[iter,3] = 14.0
261 Begin iteration:
262
263 iter = 11
264 cord_individual_obj[indivial_i,:] = [ 0. 4. 78. 82.]
265 cord_individual_obj[indivial_i,:] = [ 1. 6. 52. 58.]
266 cord_individual_obj[indivial_i,:] = [ 2. 6. 8. 14.]
267 cord_individual_obj[indivial_i,:] = [ 3. 6. 50. 56.]
268 cord_individual_obj[indivial_i,:] = [ 4. 6. 44. 50.]
269 cord_individual_obj[indivial_i,:] = [ 5. 6. 32. 38.]
270 cord_individual_obj[indivial_i,:] = [ 6. 4. 70. 74.]
271 cord_individual_obj[indivial_i,:] = [ 7. 6. 62. 68.]
272 cord_individual_obj[indivial_i,:] = [ 8. 6. 12. 18.]
273 cord_individual_obj[indivial_i,:] = [ 9. 6. 8. 14.]
274 cord_individual_obj[indivial_i,:] = [10. 4. 70. 74.]
275 cord_individual_obj[indivial_i,:] = [11. 4. 12. 16.]
276 cord_individual_obj[indivial_i,:] = [12. 6. 24. 30.]
277 cord_individual_obj[indivial_i,:] = [13. 6. 20. 26.]
278 cord_individual_obj[indivial_i,:] = [14. 5. 12. 17.]
279
280 min(cord_individual_obj[:,3]) = 14.0
281 historl_G_best_iter[iter,3] = 14.0
282 Begin iteration:
283
284 iter = 12
285 cord_individual_obj[indivial_i,:] = [ 0. 6. 8. 14.]
286 cord_individual_obj[indivial_i,:] = [ 1. 4. 12. 16.]
287 cord_individual_obj[indivial_i,:] = [ 2. 4. 38. 42.]
288 cord_individual_obj[indivial_i,:] = [ 3. 4. 48. 52.]
289 cord_individual_obj[indivial_i,:] = [ 4. 4. 72. 76.]
290 cord_individual_obj[indivial_i,:] = [ 5. 4. 50. 54.]
291 cord_individual_obj[indivial_i,:] = [ 6. 6. 20. 26.]
292 cord_individual_obj[indivial_i,:] = [ 7. 6. 62. 68.]
293 cord_individual_obj[indivial_i,:] = [ 8. 4. 12. 16.]
294 cord_individual_obj[indivial_i,:] = [ 9. 6. 12. 18.]
295 cord_individual_obj[indivial_i,:] = [10. 4. 38. 42.]
296 cord_individual_obj[indivial_i,:] = [11. 6. 80. 86.]
297 cord_individual_obj[indivial_i,:] = [12. 4. 30. 34.]
298 cord_individual_obj[indivial_i,:] = [13. 6. 30. 36.]
299 cord_individual_obj[indivial_i,:] = [14. 5. 12. 17.]
300
301 min(cord_individual_obj[:,3]) = 14.0
302 historl_G_best_iter[iter,3] = 14.0
303 Begin iteration:
304
305 iter = 13
306 cord_individual_obj[indivial_i,:] = [ 0. 4. 12. 16.]
307 cord_individual_obj[indivial_i,:] = [ 1. 6. 12. 18.]
308 cord_individual_obj[indivial_i,:] = [ 2. 4. 62. 66.]
309 cord_individual_obj[indivial_i,:] = [ 3. 6. 42. 48.]
310 cord_individual_obj[indivial_i,:] = [ 4. 4. 36. 40.]
311 cord_individual_obj[indivial_i,:] = [ 5. 4. 48. 52.]
312 cord_individual_obj[indivial_i,:] = [ 6. 6. 48. 54.]
313 cord_individual_obj[indivial_i,:] = [ 7. 6. 68. 74.]
314 cord_individual_obj[indivial_i,:] = [ 8. 6. 44. 50.]
315 cord_individual_obj[indivial_i,:] = [ 9. 6. 52. 58.]
316 cord_individual_obj[indivial_i,:] = [10. 4. 72. 76.]
317 cord_individual_obj[indivial_i,:] = [11. 6. 8. 14.]
318 cord_individual_obj[indivial_i,:] = [12. 6. 24. 30.]
319 cord_individual_obj[indivial_i,:] = [13. 6. 52. 58.]
320 cord_individual_obj[indivial_i,:] = [14. 5. 88. 93.]
321
322 min(cord_individual_obj[:,3]) = 14.0
323 historl_G_best_iter[iter,3] = 14.0
324 Begin iteration:
325
326 iter = 14
327 cord_individual_obj[indivial_i,:] = [ 0. 4. 72. 76.]
328 cord_individual_obj[indivial_i,:] = [ 1. 4. 38. 42.]
329 cord_individual_obj[indivial_i,:] = [ 2. 4. 86. 90.]
330 cord_individual_obj[indivial_i,:] = [ 3. 5. 42. 47.]
331 cord_individual_obj[indivial_i,:] = [ 4. 4. 72. 76.]

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332     cord_individual_obj[indivial_i, :] = [ 5. 6. 50. 56.]
333     cord_individual_obj[indivial_i, :] = [ 6. 4. 50. 54.]
334     cord_individual_obj[indivial_i, :] = [ 7. 6. 62. 68.]
335     cord_individual_obj[indivial_i, :] = [ 8. 4. 24. 28.]
336     cord_individual_obj[indivial_i, :] = [ 9. 6. 12. 18.]
337     cord_individual_obj[indivial_i, :] = [10. 4. 78. 82.]
338     cord_individual_obj[indivial_i, :] = [11. 4. 12. 16.]
339     cord_individual_obj[indivial_i, :] = [12. 4. 42. 46.]
340     cord_individual_obj[indivial_i, :] = [13. 6. 20. 26.]
341     cord_individual_obj[indivial_i, :] = [14. 6. 8. 14.]
342
343 min(cord_individual_obj[:, 3]) = 14.0
344 historl_G_best_iter[iter, 3] = 14.0
345 Begin iteration:
346
347 iter = 15
348     cord_individual_obj[indivial_i, :] = [ 0. 4. 36. 40.]
349     cord_individual_obj[indivial_i, :] = [ 1. 4. 28. 32.]
350     cord_individual_obj[indivial_i, :] = [ 2. 6. 8. 14.]
351     cord_individual_obj[indivial_i, :] = [ 3. 4. 68. 72.]
352     cord_individual_obj[indivial_i, :] = [ 4. 6. 36. 42.]
353     cord_individual_obj[indivial_i, :] = [ 5. 5. 42. 47.]
354     cord_individual_obj[indivial_i, :] = [ 6. 6. 36. 42.]
355     cord_individual_obj[indivial_i, :] = [ 7. 6. 78. 84.]
356     cord_individual_obj[indivial_i, :] = [ 8. 6. 66. 72.]
357     cord_individual_obj[indivial_i, :] = [ 9. 6. 12. 18.]
358     cord_individual_obj[indivial_i, :] = [10. 4. 86. 90.]
359     cord_individual_obj[indivial_i, :] = [11. 4. 56. 60.]
360     cord_individual_obj[indivial_i, :] = [12. 5. 38. 43.]
361     cord_individual_obj[indivial_i, :] = [13. 6. 44. 50.]
362     cord_individual_obj[indivial_i, :] = [14. 4. 12. 16.]
363
364 min(cord_individual_obj[:, 3]) = 14.0
365 historl_G_best_iter[iter, 3] = 14.0
366 Begin iteration:
367
368 iter = 16
369     cord_individual_obj[indivial_i, :] = [ 0. 6. 64. 70.]
370     cord_individual_obj[indivial_i, :] = [ 1. 4. 72. 76.]
371     cord_individual_obj[indivial_i, :] = [ 2. 4. 38. 42.]
372     cord_individual_obj[indivial_i, :] = [ 3. 6. 50. 56.]
373     cord_individual_obj[indivial_i, :] = [ 4. 4. 72. 76.]
374     cord_individual_obj[indivial_i, :] = [ 5. 5. 36. 41.]
375     cord_individual_obj[indivial_i, :] = [ 6. 4. 70. 74.]
376     cord_individual_obj[indivial_i, :] = [ 7. 6. 62. 68.]
377     cord_individual_obj[indivial_i, :] = [ 8. 6. 16. 22.]
378     cord_individual_obj[indivial_i, :] = [ 9. 6. 8. 14.]
379     cord_individual_obj[indivial_i, :] = [10. 6. 8. 14.]
380     cord_individual_obj[indivial_i, :] = [11. 4. 104. 108.]
381     cord_individual_obj[indivial_i, :] = [12. 4. 18. 22.]
382     cord_individual_obj[indivial_i, :] = [13. 6. 32. 38.]
383     cord_individual_obj[indivial_i, :] = [14. 6. 12. 18.]
384
385 min(cord_individual_obj[:, 3]) = 14.0
386 historl_G_best_iter[iter, 3] = 14.0
387 Begin iteration:
388
389 iter = 17
390     cord_individual_obj[indivial_i, :] = [ 0. 4. 96. 100.]
391     cord_individual_obj[indivial_i, :] = [ 1. 6. 12. 18.]
392     cord_individual_obj[indivial_i, :] = [ 2. 4. 44. 48.]
393     cord_individual_obj[indivial_i, :] = [ 3. 6. 42. 48.]
394     cord_individual_obj[indivial_i, :] = [ 4. 4. 88. 92.]
395     cord_individual_obj[indivial_i, :] = [ 5. 4. 62. 66.]
396     cord_individual_obj[indivial_i, :] = [ 6. 4. 28. 32.]
397     cord_individual_obj[indivial_i, :] = [ 7. 6. 62. 68.]
398     cord_individual_obj[indivial_i, :] = [ 8. 5. 38. 43.]
399     cord_individual_obj[indivial_i, :] = [ 9. 6. 12. 18.]
400     cord_individual_obj[indivial_i, :] = [10. 6. 24. 30.]
401     cord_individual_obj[indivial_i, :] = [11. 6. 8. 14.]
402     cord_individual_obj[indivial_i, :] = [12. 6. 8. 14.]
403     cord_individual_obj[indivial_i, :] = [13. 6. 60. 66.]
404     cord_individual_obj[indivial_i, :] = [14. 4. 12. 16.]
405
406 min(cord_individual_obj[:, 3]) = 14.0
407 historl_G_best_iter[iter, 3] = 14.0
408 Begin iteration:
409
410 iter = 18
411     cord_individual_obj[indivial_i, :] = [ 0. 6. 8. 14.]
412     cord_individual_obj[indivial_i, :] = [ 1. 6. 12. 18.]
413     cord_individual_obj[indivial_i, :] = [ 2. 4. 80. 84.]
414     cord_individual_obj[indivial_i, :] = [ 3. 4. 82. 86.]
415     cord_individual_obj[indivial_i, :] = [ 4. 6. 60. 66.]

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416 cord_individual_obj[indivial_i,:] = [ 5. 6. 50. 56.]
417 cord_individual_obj[indivial_i,:] = [ 6. 4. 34. 38.]
418 cord_individual_obj[indivial_i,:] = [ 7. 6. 90. 96.]
419 cord_individual_obj[indivial_i,:] = [ 8. 6. 14. 20.]
420 cord_individual_obj[indivial_i,:] = [ 9. 6. 18. 24.]
421 cord_individual_obj[indivial_i,:] = [10. 6. 24. 30.]
422 cord_individual_obj[indivial_i,:] = [11. 4. 72. 76.]
423 cord_individual_obj[indivial_i,:] = [12. 5. 66. 71.]
424 cord_individual_obj[indivial_i,:] = [13. 6. 14. 20.]
425 cord_individual_obj[indivial_i,:] = [14. 6. 44. 50.]
426
427 min(cord_individual_obj[:,3]) = 14.0
428 historl_G_best_iter[iter,3] = 14.0
429 Begin iteration:
430
431 iter = 19
432 cord_individual_obj[indivial_i,:] = [ 0. 4. 32. 36.]
433 cord_individual_obj[indivial_i,:] = [ 1. 4. 94. 98.]
434 cord_individual_obj[indivial_i,:] = [ 2. 4. 34. 38.]
435 cord_individual_obj[indivial_i,:] = [ 3. 5. 20. 25.]
436 cord_individual_obj[indivial_i,:] = [ 4. 4. 20. 24.]
437 cord_individual_obj[indivial_i,:] = [ 5. 6. 12. 18.]
438 cord_individual_obj[indivial_i,:] = [ 6. 4. 64. 68.]
439 cord_individual_obj[indivial_i,:] = [ 7. 6. 8. 14.]
440 cord_individual_obj[indivial_i,:] = [ 8. 5. 68. 73.]
441 cord_individual_obj[indivial_i,:] = [ 9. 6. 12. 18.]
442 cord_individual_obj[indivial_i,:] = [10. 6. 12. 18.]
443 cord_individual_obj[indivial_i,:] = [11. 6. 24. 30.]
444 cord_individual_obj[indivial_i,:] = [12. 5. 58. 63.]
445 cord_individual_obj[indivial_i,:] = [13. 6. 24. 30.]
446 cord_individual_obj[indivial_i,:] = [14. 5. 40. 45.]
447
448 min(cord_individual_obj[:,3]) = 14.0
449 historl_G_best_iter[iter,3] = 14.0
450 Begin iteration:
451
452 iter = 20
453 cord_individual_obj[indivial_i,:] = [ 0. 6. 12. 18.]
454 cord_individual_obj[indivial_i,:] = [ 1. 6. 8. 14.]
455 cord_individual_obj[indivial_i,:] = [ 2. 6. 12. 18.]
456 cord_individual_obj[indivial_i,:] = [ 3. 5. 36. 41.]
457 cord_individual_obj[indivial_i,:] = [ 4. 4. 38. 42.]
458 cord_individual_obj[indivial_i,:] = [ 5. 5. 12. 17.]
459 cord_individual_obj[indivial_i,:] = [ 6. 6. 12. 18.]
460 cord_individual_obj[indivial_i,:] = [ 7. 6. 12. 18.]
461 cord_individual_obj[indivial_i,:] = [ 8. 6. 24. 30.]
462 cord_individual_obj[indivial_i,:] = [ 9. 6. 12. 18.]
463 cord_individual_obj[indivial_i,:] = [10. 6. 12. 18.]
464 cord_individual_obj[indivial_i,:] = [11. 4. 48. 52.]
465 cord_individual_obj[indivial_i,:] = [12. 6. 8. 14.]
466 cord_individual_obj[indivial_i,:] = [13. 6. 16. 22.]
467 cord_individual_obj[indivial_i,:] = [14. 6. 44. 50.]
468
469 min(cord_individual_obj[:,3]) = 14.0
470 historl_G_best_iter[iter,3] = 14.0
471 Begin iteration:
472
473 iter = 21
474 cord_individual_obj[indivial_i,:] = [ 0. 4. 62. 66.]
475 cord_individual_obj[indivial_i,:] = [ 1. 6. 24. 30.]
476 cord_individual_obj[indivial_i,:] = [ 2. 4. 48. 52.]
477 cord_individual_obj[indivial_i,:] = [ 3. 6. 12. 18.]
478 cord_individual_obj[indivial_i,:] = [ 4. 4. 58. 62.]
479 cord_individual_obj[indivial_i,:] = [ 5. 6. 12. 18.]
480 cord_individual_obj[indivial_i,:] = [ 6. 4. 38. 42.]
481 cord_individual_obj[indivial_i,:] = [ 7. 6. 12. 18.]
482 cord_individual_obj[indivial_i,:] = [ 8. 5. 32. 37.]
483 cord_individual_obj[indivial_i,:] = [ 9. 6. 12. 18.]
484 cord_individual_obj[indivial_i,:] = [10. 6. 12. 18.]
485 cord_individual_obj[indivial_i,:] = [11. 6. 8. 14.]
486 cord_individual_obj[indivial_i,:] = [12. 6. 8. 14.]
487 cord_individual_obj[indivial_i,:] = [13. 6. 12. 18.]
488 cord_individual_obj[indivial_i,:] = [14. 5. 80. 85.]
489
490 min(cord_individual_obj[:,3]) = 14.0
491 historl_G_best_iter[iter,3] = 14.0
492 Begin iteration:
493
494 iter = 22
495 cord_individual_obj[indivial_i,:] = [ 0. 6. 30. 36.]
496 cord_individual_obj[indivial_i,:] = [ 1. 4. 40. 44.]
497 cord_individual_obj[indivial_i,:] = [ 2. 4. 42. 46.]
498 cord_individual_obj[indivial_i,:] = [ 3. 5. 12. 17.]
499 cord_individual_obj[indivial_i,:] = [ 4. 6. 12. 18.]

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500 cord_individual_obj[indivial_i,:] = [ 5. 5. 16. 21.]
501 cord_individual_obj[indivial_i,:] = [ 6. 6. 62. 68.]
502 cord_individual_obj[indivial_i,:] = [ 7. 6. 24. 30.]
503 cord_individual_obj[indivial_i,:] = [ 8. 5. 12. 17.]
504 cord_individual_obj[indivial_i,:] = [ 9. 6. 8. 14.]
505 cord_individual_obj[indivial_i,:] = [10. 6. 8. 14.]
506 cord_individual_obj[indivial_i,:] = [11. 4. 104. 108.]
507 cord_individual_obj[indivial_i,:] = [12. 5. 18. 23.]
508 cord_individual_obj[indivial_i,:] = [13. 6. 8. 14.]
509 cord_individual_obj[indivial_i,:] = [14. 6. 8. 14.]
510
511 min(cord_individual_obj[:,3]) = 14.0
512 historl_G_best_iter[iter,3] = 14.0
513 Begin iteration:
514
515 iter = 23
516 cord_individual_obj[indivial_i,:] = [ 0. 6. 12. 18.]
517 cord_individual_obj[indivial_i,:] = [ 1. 6. 30. 36.]
518 cord_individual_obj[indivial_i,:] = [ 2. 6. 42. 48.]
519 cord_individual_obj[indivial_i,:] = [ 3. 6. 12. 18.]
520 cord_individual_obj[indivial_i,:] = [ 4. 4. 118. 122.]
521 cord_individual_obj[indivial_i,:] = [ 5. 4. 52. 56.]
522 cord_individual_obj[indivial_i,:] = [ 6. 6. 34. 40.]
523 cord_individual_obj[indivial_i,:] = [ 7. 6. 28. 34.]
524 cord_individual_obj[indivial_i,:] = [ 8. 6. 8. 14.]
525 cord_individual_obj[indivial_i,:] = [ 9. 6. 20. 26.]
526 cord_individual_obj[indivial_i,:] = [10. 6. 36. 42.]
527 cord_individual_obj[indivial_i,:] = [11. 6. 8. 14.]
528 cord_individual_obj[indivial_i,:] = [12. 6. 8. 14.]
529 cord_individual_obj[indivial_i,:] = [13. 6. 20. 26.]
530 cord_individual_obj[indivial_i,:] = [14. 5. 64. 69.]
531
532 min(cord_individual_obj[:,3]) = 14.0
533 historl_G_best_iter[iter,3] = 14.0
534 Begin iteration:
535
536 iter = 24
537 cord_individual_obj[indivial_i,:] = [ 0. 6. 12. 18.]
538 cord_individual_obj[indivial_i,:] = [ 1. 6. 12. 18.]
539 cord_individual_obj[indivial_i,:] = [ 2. 4. 38. 42.]
540 cord_individual_obj[indivial_i,:] = [ 3. 5. 58. 63.]
541 cord_individual_obj[indivial_i,:] = [ 4. 6. 8. 14.]
542 cord_individual_obj[indivial_i,:] = [ 5. 6. 28. 34.]
543 cord_individual_obj[indivial_i,:] = [ 6. 6. 44. 50.]
544 cord_individual_obj[indivial_i,:] = [ 7. 6. 12. 18.]
545 cord_individual_obj[indivial_i,:] = [ 8. 4. 32. 36.]
546 cord_individual_obj[indivial_i,:] = [ 9. 6. 8. 14.]
547 cord_individual_obj[indivial_i,:] = [10. 6. 24. 30.]
548 cord_individual_obj[indivial_i,:] = [11. 6. 60. 66.]
549 cord_individual_obj[indivial_i,:] = [12. 5. 84. 89.]
550 cord_individual_obj[indivial_i,:] = [13. 6. 44. 50.]
551 cord_individual_obj[indivial_i,:] = [14. 6. 12. 18.]
552
553 min(cord_individual_obj[:,3]) = 14.0
554 historl_G_best_iter[iter,3] = 14.0
555 Begin iteration:
556
557 iter = 25
558 cord_individual_obj[indivial_i,:] = [ 0. 3. 64. 67.]
559 cord_individual_obj[indivial_i,:] = [ 1. 4. 38. 42.]
560 cord_individual_obj[indivial_i,:] = [ 2. 4. 42. 46.]
561 cord_individual_obj[indivial_i,:] = [ 3. 6. 24. 30.]
562 cord_individual_obj[indivial_i,:] = [ 4. 5. 48. 53.]
563 cord_individual_obj[indivial_i,:] = [ 5. 4. 48. 52.]
564 cord_individual_obj[indivial_i,:] = [ 6. 5. 28. 33.]
565 cord_individual_obj[indivial_i,:] = [ 7. 6. 12. 18.]
566 cord_individual_obj[indivial_i,:] = [ 8. 5. 34. 39.]
567 cord_individual_obj[indivial_i,:] = [ 9. 6. 8. 14.]
568 cord_individual_obj[indivial_i,:] = [10. 6. 22. 28.]
569 cord_individual_obj[indivial_i,:] = [11. 4. 12. 16.]
570 cord_individual_obj[indivial_i,:] = [12. 6. 8. 14.]
571 cord_individual_obj[indivial_i,:] = [13. 6. 8. 14.]
572 cord_individual_obj[indivial_i,:] = [14. 5. 18. 23.]
573
574 min(cord_individual_obj[:,3]) = 14.0
575 historl_G_best_iter[iter,3] = 14.0
576 Begin iteration:
577
578 iter = 26
579 cord_individual_obj[indivial_i,:] = [ 0. 6. 8. 14.]
580 cord_individual_obj[indivial_i,:] = [ 1. 4. 82. 86.]
581 cord_individual_obj[indivial_i,:] = [ 2. 5. 62. 67.]
582 cord_individual_obj[indivial_i,:] = [ 3. 5. 58. 63.]
583 cord_individual_obj[indivial_i,:] = [ 4. 5. 68. 73.]

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584 cord_individual_obj[indivial_i,:] = [ 5. 4. 18. 22.]
585 cord_individual_obj[indivial_i,:] = [ 6. 5. 98. 103.]
586 cord_individual_obj[indivial_i,:] = [ 7. 6. 12. 18.]
587 cord_individual_obj[indivial_i,:] = [ 8. 3. 82. 85.]
588 cord_individual_obj[indivial_i,:] = [ 9. 6. 8. 14.]
589 cord_individual_obj[indivial_i,:] = [10. 6. 18. 24.]
590 cord_individual_obj[indivial_i,:] = [11. 6. 18. 24.]
591 cord_individual_obj[indivial_i,:] = [12. 4. 80. 84.]
592 cord_individual_obj[indivial_i,:] = [13. 6. 8. 14.]
593 cord_individual_obj[indivial_i,:] = [14. 4. 58. 62.]
594
595 min(cord_individual_obj[:,3]) = 14.0
596 historl_G_best_iter[iter,3] = 14.0
597 Begin iteration:
598
599 iter = 27
600 cord_individual_obj[indivial_i,:] = [ 0. 5. 32. 37.]
601 cord_individual_obj[indivial_i,:] = [ 1. 4. 32. 36.]
602 cord_individual_obj[indivial_i,:] = [ 2. 5. 12. 17.]
603 cord_individual_obj[indivial_i,:] = [ 3. 5. 26. 31.]
604 cord_individual_obj[indivial_i,:] = [ 4. 5. 32. 37.]
605 cord_individual_obj[indivial_i,:] = [ 5. 6. 8. 14.]
606 cord_individual_obj[indivial_i,:] = [ 6. 6. 8. 14.]
607 cord_individual_obj[indivial_i,:] = [ 7. 6. 8. 14.]
608 cord_individual_obj[indivial_i,:] = [ 8. 4. 32. 36.]
609 cord_individual_obj[indivial_i,:] = [ 9. 6. 12. 18.]
610 cord_individual_obj[indivial_i,:] = [10. 6. 12. 18.]
611 cord_individual_obj[indivial_i,:] = [11. 5. 62. 67.]
612 cord_individual_obj[indivial_i,:] = [12. 5. 54. 59.]
613 cord_individual_obj[indivial_i,:] = [13. 6. 12. 18.]
614 cord_individual_obj[indivial_i,:] = [14. 5. 32. 37.]
615
616 min(cord_individual_obj[:,3]) = 14.0
617 historl_G_best_iter[iter,3] = 14.0
618 Begin iteration:
619
620 iter = 28
621 cord_individual_obj[indivial_i,:] = [ 0. 5. 24. 29.]
622 cord_individual_obj[indivial_i,:] = [ 1. 4. 40. 44.]
623 cord_individual_obj[indivial_i,:] = [ 2. 5. 32. 37.]
624 cord_individual_obj[indivial_i,:] = [ 3. 4. 56. 60.]
625 cord_individual_obj[indivial_i,:] = [ 4. 5. 58. 63.]
626 cord_individual_obj[indivial_i,:] = [ 5. 5. 12. 17.]
627 cord_individual_obj[indivial_i,:] = [ 6. 5. 20. 25.]
628 cord_individual_obj[indivial_i,:] = [ 7. 6. 12. 18.]
629 cord_individual_obj[indivial_i,:] = [ 8. 6. 44. 50.]
630 cord_individual_obj[indivial_i,:] = [ 9. 6. 12. 18.]
631 cord_individual_obj[indivial_i,:] = [10. 6. 12. 18.]
632 cord_individual_obj[indivial_i,:] = [11. 6. 8. 14.]
633 cord_individual_obj[indivial_i,:] = [12. 5. 36. 41.]
634 cord_individual_obj[indivial_i,:] = [13. 6. 44. 50.]
635 cord_individual_obj[indivial_i,:] = [14. 5. 84. 89.]
636
637 min(cord_individual_obj[:,3]) = 14.0
638 historl_G_best_iter[iter,3] = 14.0
639 Begin iteration:
640
641 iter = 29
642 cord_individual_obj[indivial_i,:] = [ 0. 5. 8. 13.]
643 cord_individual_obj[indivial_i,:] = [ 1. 4. 18. 22.]
644 cord_individual_obj[indivial_i,:] = [ 2. 5. 22. 27.]
645 cord_individual_obj[indivial_i,:] = [ 3. 5. 12. 17.]
646 cord_individual_obj[indivial_i,:] = [ 4. 5. 32. 37.]
647 cord_individual_obj[indivial_i,:] = [ 5. 6. 12. 18.]
648 cord_individual_obj[indivial_i,:] = [ 6. 6. 8. 14.]
649 cord_individual_obj[indivial_i,:] = [ 7. 6. 8. 14.]
650 cord_individual_obj[indivial_i,:] = [ 8. 4. 12. 16.]
651 cord_individual_obj[indivial_i,:] = [ 9. 6. 18. 24.]
652 cord_individual_obj[indivial_i,:] = [10. 6. 8. 14.]
653 cord_individual_obj[indivial_i,:] = [11. 5. 104. 109.]
654 cord_individual_obj[indivial_i,:] = [12. 6. 8. 14.]
655 cord_individual_obj[indivial_i,:] = [13. 6. 8. 14.]
656 cord_individual_obj[indivial_i,:] = [14. 6. 8. 14.]
657
658 min(cord_individual_obj[:,3]) = 13.0
659 historl_G_best_iter[iter,3] = 13.0
660 Begin iteration:
661
662 iter = 30
663 cord_individual_obj[indivial_i,:] = [ 0. 5. 24. 29.]
664 cord_individual_obj[indivial_i,:] = [ 1. 4. 36. 40.]
665 cord_individual_obj[indivial_i,:] = [ 2. 5. 32. 37.]
666 cord_individual_obj[indivial_i,:] = [ 3. 5. 66. 71.]
667 cord_individual_obj[indivial_i,:] = [ 4. 5. 24. 29.]

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668 cord_individual_obj[indivial_i, :] = [ 5. 4. 54. 58.]
669 cord_individual_obj[indivial_i, :] = [ 6. 6. 28. 34.]
670 cord_individual_obj[indivial_i, :] = [ 7. 5. 28. 33.]
671 cord_individual_obj[indivial_i, :] = [ 8. 5. 12. 17.]
672 cord_individual_obj[indivial_i, :] = [ 9. 5. 8. 13.]
673 cord_individual_obj[indivial_i, :] = [10. 5. 24. 29.]
674 cord_individual_obj[indivial_i, :] = [11. 5. 8. 13.]
675 cord_individual_obj[indivial_i, :] = [12. 6. 12. 18.]
676 cord_individual_obj[indivial_i, :] = [13. 4. 38. 42.]
677 cord_individual_obj[indivial_i, :] = [14. 6. 30. 36.]
678
679 min(cord_individual_obj[:, 3]) = 13.0
680 historl_G_best_iter[iter, 3] = 13.0
681 Iteration calculate over
682
683
684
685
686 All item are in Bin and:
687 Bin area = 1080
688 Real_area = 108.0
689 Proportion_of_area = 0.1
690 BEST_CHROM =
691     berth: [ 2.5 26. 12. 20.5 16.5 7. ]
692     time: [0. 0. 0. 0. 0. ]
693     num_QC: [2. 2. 3. 2. 3. 2.]
694 Objective function values and some other indicators:
695 Obj0 = 5.00          Obj1 = 8.00          Obj0 + Obj1 = 13.00
696 Total movement of crane: 8.00
697 Total waiting time in berth position: 0.00
698 Total index of q during berthing: 553.00
699 Specific arrangement for each vessel:
700
    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
    .0                 gama_i1 + 1: 2.0      gama_i1 - gama_i0: 1.0      duration_time_i: 2.0
80.0               work load gap_i: 0
701
    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
    load_i: 120.0     work load gap_i: 0
702
    V_id: 2           li: 6.0           xi: 12.0           bow of i: 9.0           tail of i: 15.0           gama_i0: 0.0           gama_i1: 4
    .0                 gama_i1 + 1: 5.0      gama_i1 - gama_i0: 4.0      duration_time_i: 5.0
    load_i: 260.0     work load gap_i: 0
703
    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
    load_i: 80.0       work load gap_i: 0
704
    V_id: 4           li: 3.0           xi: 16.5           bow of i: 15.0           tail of i: 18.0           gama_i0: 0.0           gama_i1: 3
    .0                 gama_i1 + 1: 4.0      gama_i1 - gama_i0: 3.0      duration_time_i: 4.0
    load_i: 200.0     work load gap_i: 0
705
    V_id: 5           li: 4.0           xi: 7.0            bow of i: 5.0           tail of i: 9.0           gama_i0: 0.0           gama_i1: 5.0
    .0                 gama_i1 + 1: 6.0      gama_i1 - gama_i0: 5.0      duration_time_i: 6.0
    220.0             work load gap_i: 0
706
707 Algorithm finished and the total CPU time: 149 s
708 End
709

```