```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=45359
3
   import sys; print('Python %s on %s' % (sys.version, sys.platform))
   01_My_Python_Code'])
6
  PyDev console: starting.
  Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
8
  python code/01_My_Python_Code')
10 Backend TkAgg is interactive backend. Turning interactive mode on.
   Waiting 1s.....
12
13
  This is the R_2_1 _standard_test.xlsx optimization process solved by ENSGA-II algorithm.
14
15
   Start
16
17
   Before iteration:
18
     Read basic data
19
     Parameter setting:
       trail = 35
20
21
       Pop\_size = 20
       Tolerance iteration unchanged number = 10
23
       Chrom\_size = 6
       Iter_num_GA = 300
24
25
       Select_rate = 0.9
26
       Crossover rate = 0.8
27
       Mutation rate = 0.8
28
       Mu_oper_type = 2
29
       vessel\_move\_way = 1
30
       coefficient for Obj1= 0.5
       coefficient for Obj2= 1.5
31
       gen = 0
32
33
   Iteration begin:
34
35
   Beging the No. 0 iteration:
     obj[0] = 13.08 temp_best_value_gen = 13.08
36
37
     The No. 0 iteration is finished!
38
39
   Beging the No. 1 iteration:
40
     obj[gen-1] = 13.08 temp_best_value_gen = 13.08
41
     No, maintain solution and obj[gen] = 13.08, and the tolerance_counter = 1
42
     solution chromosome =
43
       first level: [ [2.03 4.13]
       second level: [0, 2,]
44
       third level: [4. 8.]]
45
46
     The No. 1 iteration is finished!
47
48
   Beging the No. 2 iteration:
     obj[gen-1] = 13.08 temp_best_value_gen = 13.08
49
50
     No, maintain solution and obj[gen] = 13.08, and the tolerance_counter = 2
51
     solution chromosome =
52
       first level: [ [2.03 4.13]
53
       second level: [0. 2.]
54
       third level: [4. 8.]]
55
     The No. 2 iteration is finished!
56
57
   Beging the No. 3 iteration:
58
     obi[gen-1] = 13.08 temp best value gen = 8.64
59
     Yes, update solution and obj[gen] = 8.64
60
     solution chromosome =
61
       first level: [ [2.03 4.07]
62
       second level: [0. 2.]
       third level: [4. 8.]]
63
     The No. 3 iteration is finished!
64
65
   Beging the No. 4 iteration:
66
67
     obj[gen-1] = 8.64 temp_best_value_gen = 8.64
68
     No, maintain solution and obj[gen] = 8.64, and the tolerance_counter = 1
69
     solution chromosome =
70
       first level: [ [2.03 4.07]
       second level: [0. 2.]
71
       third level: [4. 8.]]
73
     The No. 4 iteration is finished!
74
75
   Beging the No. 5 iteration:
     obi[gen-1] = 8.64 temp best value gen = 8.64
76
     No, maintain solution and obj[gen] = 8.64, and the tolerance counter = 2
77
     solution chromosome =
78
       first level: [ [2.03 4.07]
```

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80
          second level: [0, 2,]
 81
          third level: [4. 8.]]
 82
       The No. 5 iteration is finished!
 83
     Beging the No. 6 iteration:
 85
       obj[gen-1] = 8.64 temp best value gen = 8.64
       No, maintain solution and obj[gen] = \overline{8.64}, and the tolerance_counter = 3
 86
 87
        solution chromosome =
 88
          first level: [[2.03 4.07]
 89
          second level: [0. 2.]
 90
          third level: [4. 8.]]
 91
       The No. 6 iteration is finished!
 92
 93 Beging the No. 7 iteration:
 94
        obj[gen-1] = 8.64 temp_best_value_gen = 8.64
 95
       No, maintain solution and obj[gen] = 8.64, and the tolerance_counter = 4
 96
       solution chromosome =
 97
          first level: [ [2.03 4.07]
 98
          second level: [0. 2.]
 99
          third level: [4. 8.]]
100
       The No. 7 iteration is finished!
101
102 Beging the No. 8 iteration:
103
       obj[gen-1] = 8.64 temp best value gen = 8.64
104
       No, maintain solution and obj[gen] = 8.64, and the tolerance_counter = 5
105
        solution chromosome =
          first level: [ [2.03 4.07]
106
          second level: [0. 2.]
107
          third level: [4. 8.]
108
109
       The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112
        obj[gen-1] = 8.64 temp_best_value_gen = 8.64
113
       No, maintain solution and obj[gen] = 8.64, and the tolerance_counter = 6
       solution chromosome =
114
115
          first level: [ [2.03 4.07]
116
          second level: [0. 2.]
          third level: [4, 8,]]
117
118
       The No. 9 iteration is finished!
119
120 Beging the No. 10 iteration:
121
       obj[gen-1] = 8.64 temp_best_value_gen = 8.64
122
       No, maintain solution and obj[gen] = 8.64, and the tolerance_counter = 7
123
        solution chromosome =
124
          first level: [ [2.03 4.07]
125
          second level: [0. 2.]
126
          third level: [4. 8.]]
127
       The No. 10 iteration is finished!
128
129 Beging the No. 11 iteration:
130
        obj[gen-1] = 8.64 temp_best_value_gen = 8.00
131
        Yes, update solution and obj[gen] = 8.00
132
       solution chromosome =
133
          first level: [ [2. 8.]
134
          second level: [0. 4.]
135
          third level: [3. 6.]]
136
       The No. 11 iteration is finished!
137
138 Beging the No. 12 iteration:
       obj[gen-1] = 8.00 temp_best_value_gen = 7.74
139
140
        Yes, update solution and obj[gen] = 7.74
141
        solution chromosome =
142
          first level: [ [2.47 4.02]
          second level: [1. 0.]
143
          third level: [2. 7.]]
144
145
       The No. 12 iteration is finished!
146
147 Beging the No. 13 iteration:
        obj[gen-1] = 7.74 temp_best_value_gen = 7.74
148
149
       No, maintain solution and obj[gen] = 7.74, and the tolerance_counter = 1
150
       solution chromosome =
151
          first level: [ [2.47 4.02]
152
          second level: [1. 0.]
153
          third level: [2. 7.]]
154
       The No. 13 iteration is finished!
155
156 Beging the No. 14 iteration:
157
       obj[gen-1] = 7.74 temp_best_value_gen = 7.74
158
       No, maintain solution and obj[gen] = 7.74, and the tolerance_counter = 2
159
        solution chromosome =
160
          first level: [[2.47 4.02]
          second level: [1. 0.]
161
162
          third level: [2. 7.]]
163
        The No. 14 iteration is finished!
```

```
164
165 Beging the No. 15 iteration:
        obj[gen-1] = 7.74 temp_best_value_gen = 7.74
166
167
       No, maintain solution and obj[gen] = 7.74, and the tolerance_counter = 3
168
        solution chromosome =
169
          first level: [ [2.47 4.02]
170
          second level: [1. 0.]
171
          third level: [2. 7.]]
172
        The No. 15 iteration is finished!
173
174 Beging the No. 16 iteration:
175
       obj[gen-1] = 7.74 temp_best_value_gen = 7.74
       No, maintain solution and obj[gen] = 7.74, and the tolerance counter = 4
176
177
       solution chromosome =
          first level: [ [2.47 4.02]
178
179
          second level: [1. 0.]
180
          third level: [2. 7.]]
181
        The No. 16 iteration is finished!
182
183 Beging the No. 17 iteration:
       obj[gen-1] = 7.74 temp_best_value_gen = 7.74
184
185
       No, maintain solution and obj[gen] = 7.74, and the tolerance_counter = 5
186
        solution chromosome =
187
          first level: [ [2.47 4.02]
          second level: [1. 0.]
188
          third level: [2. 7.]]
189
190
       The No. 17 iteration is finished!
191
192 Beging the No. 18 iteration:
193
       obj[gen-1] = 7.74 temp_best_value_gen = 7.74
194
       No, maintain solution and obj[gen] = 7.74, and the tolerance counter = 6
195
       solution chromosome =
196
          first level: [ [2.47 4.02]
197
          second level: [1. 0.]
198
          third level: [2. 7.]]
199
       The No. 18 iteration is finished!
200
201 Beging the No. 19 iteration:
202
       obj[gen-1] = 7.74 temp_best_value_gen = 7.74
203
       No, maintain solution and obj[gen] = 7.74, and the tolerance_counter = 7
204
       solution chromosome =
205
          first level: [ [2.47 4.02]
          second level: [1. 0.]
206
207
          third level: [2. 7.]]
208
        The No. 19 iteration is finished!
209
210 Beging the No. 20 iteration:
211
       obj[gen-1] = 7.74 temp_best_value_gen = 7.74
212
       No, maintain solution and obj[gen] = 7.74, and the tolerance_counter = 8
       solution chromosome =
213
          first level: [ [2.47 4.02]
214
215
          second level: [1. 0.]
216
          third level: [2. 7.]]
       The No. 20 iteration is finished!
217
218
219 Beging the No. 21 iteration:
       obj[gen-1] = 7.74 temp_best_value_gen = 7.74
220
221
       No, maintain solution and obj[gen] = 7.74, and the tolerance_counter = 9
222
       solution chromosome
223
          first level: [ [2.47 4.02]
224
          second level: [1. 0.]
225
          third level: [2. 7.]]
226
       The No. 21 iteration is finished!
227
228 Beging the No. 22 iteration:
229
       obj[gen-1] = 7.74 temp_best_value_gen = 7.74
230
       No, maintain solution and obj[gen] = 7.74, and the tolerance_counter = 10
231
       solution chromosome =
232
          first level: [ [2.47 4.02]
233
          second level: [1. 0.]
234
          third level: [2. 7.]]
235
       The No. 22 iteration is finished!
236
237
238
239 The iteration is terminated and then visulize the solution:
240
       solution chromosome =
241
          first level: [ [2.47 4.02]
242
          second level: [1. 0.]
243
          third level: [2. 7.]]
244
        Objective function values and some other indicators:
          Obio = 4.00
                               Obj1 = 3.83
                                                      Obj0 + Obj1 = 7.83
245
          Total movement of crane: 2.83
246
247
          Total waiting time in berth position: 1.00
```

unkno									
248	Total	index	of q du	ring bertl	hing: 19.00				
249 250	Specific V_id:	0		for each li: 4.0		xi: 2.5 bow of i: 0.5	tail of i: 4.5	gama_i0: 1.0	gama_i1: 5.0
		. d	luration_	_time_i: 4 li: 8.0	4.0	demand i: 160.0	work load i: 160.0	work load gap_i: 0	
251	V_id:	l Н	luration	li: 8.0 _time_i: 1	1.0	xi: 4.0 bow of i: 0.0 demand_i: 120.0	tail of i: 8.0 work load_i: 120.0	work load gap_i: 0 gama_i0: 0.0 work load gap_i: 0	gama_i1: 1.0
252									
253 254	Algorithm End	finish	ned and t	the total (	CPU time: 3	354 s			
255	End								