```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=8724
2
3
   import sys; print('Python %s on %s' % (sys.version, sys.platform))
   01_My_Python_Code'])
5
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 = 29
20
21
       Pop\_size = 20
       Tolerance iteration unchanged number = 8
23
       Chrom\_size = 6
       Iter_num_GA = 300
24
25
       Select_rate = 0.9
26
       Crossover rate = 0.75
       Mutation rate = 0.75
27
28
       Mu_oper_type = 1
29
       vessel\_move\_way = 2
30
       coefficient for Obj1= 1.9
       coefficient for Obj2= 0.100000000000000009
31
32
33
   Iteration begin:
34
35
   Beging the No. 0 iteration:
     obj[0] = 13.10 temp_best_value_gen = 13.10
36
37
     The No. 0 iteration is finished!
38
39
   Beging the No. 1 iteration:
40
     obj[gen-1] = 13.10 temp_best_value_gen = 13.10
41
     No, maintain solution and obj[gen] = \overline{13.10}, and the tolerance_counter = 1
42
     solution chromosome =
43
       first level: [ [3.93 5.23]
       second level: [3, 1,]
44
       third level: [2. 6.]]
45
46
     The No. 1 iteration is finished!
47
48
   Beging the No. 2 iteration:
     obj[gen-1] = 13.10 temp_best_value_gen = 12.95
49
50
     Yes, update solution and obj[gen] = 12.95
51
     solution chromosome =
52
       first level: [ [4.48 4.64]
53
       second level: [4. 1.]
54
       third level: [4. 4.]]
55
     The No. 2 iteration is finished!
56
57
   Beging the No. 3 iteration:
58
     obi[gen-1] = 12.95 temp best value gen = 12.95
59
     No, maintain solution and obj[gen] = 12.95, and the tolerance_counter = 1
60
     solution chromosome =
61
       first level: [ [4.48 4.64]
62
       second level: [4.1.]
       third level: [4. 4.]]
63
     The No. 3 iteration is finished!
64
65
   Beging the No. 4 iteration:
66
67
     obj[gen-1] = 12.95 temp_best_value_gen = 12.88
68
     Yes, update solution and obj[gen] = 12.88
69
     solution chromosome =
70
       first level: [ [4.64 4.48]
71
       second level: [1.4.]
       third level: [4. 4.]]
73
     The No. 4 iteration is finished!
74
75
   Beging the No. 5 iteration:
     obj[gen-1] = 12.88 temp_best_value_gen = 12.88
76
     No, maintain solution and obj[gen] = 12.88, and the tolerance counter = 1
77
     solution chromosome =
78
       first level: [ [4.64 4.48]
```

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80
          second level: [1, 4,]
 81
          third level: [4. 4.]]
 82
       The No. 5 iteration is finished!
 83
     Beging the No. 6 iteration:
 85
       obj[gen-1] = 12.88 temp best value gen = 12.43
        Yes, update solution and obj[gen] = 12.43
 86
 87
       solution chromosome =
 88
          first level: [ [4.48 4.64]
 89
          second level: [2, 4.]
 90
          third level: [4. 4.]]
 91
       The No. 6 iteration is finished!
 92
 93 Beging the No. 7 iteration:
 94
        obj[gen-1] = 12.43 temp_best_value_gen = 12.43
 95
       No, maintain solution and obj[gen] = 12.43, and the tolerance_counter = 1
 96
       solution chromosome =
 97
          first level: [ [4.48 4.64]
 98
          second level: [2. 4.]
 99
          third level: [4, 4,]]
       The No. 7 iteration is finished!
100
101
102 Beging the No. 8 iteration:
       obj[gen-1] = 12.43 temp best value gen = 7.80
103
104
        Yes, update solution and obj[gen] = 7.80
105
       solution chromosome
          first level: [ [2. 8.]
106
107
          second level: [2. 0.]
108
          third level: [3. 2.]]
109
       The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112
        obj[gen-1] = 7.80 temp_best_value_gen = 7.80
113
        No, maintain solution and obj[gen] = 7.80, and the tolerance_counter = 1
       solution chromosome =
114
115
          first level: [ [2. 8.]
116
          second level: [2. 0.]
          third level: [3. 2.]]
117
       The No. 9 iteration is finished!
118
119
120 Beging the No. 10 iteration:
121
       obj[gen-1] = 7.80 temp_best_value_gen = 7.80
       No, maintain solution and obj[gen] = 7.80, and the tolerance_counter = 2
122
123
        solution chromosome =
124
          first level: [ [2. 8.]
          second level: [2. 0.]
125
126
          third level: [3. 2.]]
127
       The No. 10 iteration is finished!
128
129 Beging the No. 11 iteration:
130
        obj[gen-1] = 7.80 temp_best_value_gen = 7.80
131
       No, maintain solution and obj[gen] = 7.80, and the tolerance_counter = 3
132
       solution chromosome =
133
          first level: [ [2. 8.]
134
          second level: [2. 0.]
135
          third level: [3. 2.]]
136
       The No. 11 iteration is finished!
137
138 Beging the No. 12 iteration:
       obj[gen-1] = 7.80 temp_best_value_gen = 7.80
139
140
       No, maintain solution and obj[gen] = 7.80, and the tolerance_counter = 4
141
        solution chromosome =
142
          first level: [ [2. 8.]
          second level: [2. 0.]
143
          third level: [3. 2.]]
144
145
       The No. 12 iteration is finished!
146
147 Beging the No. 13 iteration:
        obj[gen-1] = 7.80 temp_best_value_gen = 7.80
148
149
       No, maintain solution and obj[gen] = 7.80, and the tolerance_counter = 5
150
       solution chromosome =
151
          first level: [ [2. 8.]
152
          second level: [2. 0.]
153
          third level: [3. 2.]]
154
       The No. 13 iteration is finished!
155
156 Beging the No. 14 iteration:
157
       obj[gen-1] = 7.80 temp_best_value_gen = 5.70
158
        Yes, update solution and obj[gen] = 5.70
159
        solution chromosome =
160
          first level: [ [2. 8.]
          second level: [0, 0,]
161
162
          third level: [2. 2.]]
163
        The No. 14 iteration is finished!
```

```
164
165 Beging the No. 15 iteration:
        obj[gen-1] = 5.70 temp_best_value_gen = 5.70
166
167
       No, maintain solution and obj[gen] = 5.70, and the tolerance_counter = 1
168
        solution chromosome =
169
          first level: [ [2, 8.]
170
          second level: [0. 0.]
171
          third level: [2. 2.]]
172
        The No. 15 iteration is finished!
173
174 Beging the No. 16 iteration:
175
       obj[gen-1] = 5.70 temp_best_value_gen = 5.70
       No, maintain solution and obj[gen] = 5.70, and the tolerance counter = 2
176
177
       solution chromosome =
178
          first level: [ [2. 8.]
179
          second level: [0. 0.]
180
          third level: [2. 2.]]
181
        The No. 16 iteration is finished!
182
183 Beging the No. 17 iteration:
       obj[gen-1] = 5.70 temp_best_value_gen = 5.70
184
185
       No, maintain solution and obj[gen] = 5.70, and the tolerance_counter = 3
186
        solution chromosome =
187
          first level: [ [2. 8.]
          second level: [0. 0.]
188
          third level: [2. 2.]]
189
190
       The No. 17 iteration is finished!
191
192 Beging the No. 18 iteration:
193
       obj[gen-1] = 5.70 temp_best_value_gen = 5.70
194
       No, maintain solution and obj[gen] = 5.70, and the tolerance counter = 4
195
       solution chromosome =
196
          first level: [ [2. 8.]
197
          second level: [0. 0.]
198
          third level: [2. 2.]]
199
       The No. 18 iteration is finished!
200
201 Beging the No. 19 iteration:
202
       obj[gen-1] = 5.70 temp_best_value_gen = 5.70
203
       No, maintain solution and obj[gen] = 5.70, and the tolerance_counter = 5
204
       solution chromosome =
205
          first level: [ [2. 8.]
206
          second level: [0. 0.]
207
          third level: [2. 2.]]
208
        The No. 19 iteration is finished!
209
210 Beging the No. 20 iteration:
211
       obj[gen-1] = 5.70 temp_best_value_gen = 5.70
212
       No, maintain solution and obj[gen] = 5.70, and the tolerance_counter = 6
       solution chromosome =
213
          first level: [ [2. 8.]
214
215
          second level: [0. 0.]
216
          third level: [2. 2.]]
       The No. 20 iteration is finished!
217
218
219 Beging the No. 21 iteration:
       obj[gen-1] = 5.70 temp_best_value_gen = 5.70
220
221
       No, maintain solution and obj[gen] = 5.70, and the tolerance_counter = 7
222
       solution chromosome
223
          first level: [ [2. 8.]
224
          second level: [0. 0.]
225
          third level: [2. 2.]]
226
       The No. 21 iteration is finished!
227
228 Beging the No. 22 iteration:
229
       obj[gen-1] = 5.70 temp_best_value_gen = 5.70
230
       No, maintain solution and obj[gen] = 5.70, and the tolerance_counter = 8
231
       solution chromosome =
232
          first level: [ [2. 8.]
233
          second level: [0. 0.]
234
          third level: [2. 2.]
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. 8.]
242
          second level: [0. 0.]
243
          third level: [2. 2.]]
244
        Objective function values and some other indicators:
245
          Obio = 3.00
                                Obj1 = 0.00
                                                      Obj0 + Obj1 = 3.00
          Total movement of crane: 0.00
246
247
          Total waiting time in berth position: 0.00
```

unknown									
248	Total	ind	ex of q dı	iring berthing	: 31.00				
249 250	Specific V_id:	arra	angement	for each vess li: 4.0	el:	xi: 2.0 bow of i: 0.0	tail of i: 4.0	gama_i0: 0.0	gama_i1: 4.0
230	v_iu.	. 0	duration	_time_i: 4.0	2	demand_i: 160.0	work load i: 160.0	work load gap i: 0	gama_11. 4.0
251	V_id:	1		li: 8.0	2	xi: 8.0 bow of i: 4.0 demand_i: 120.0	work load_i: 160.0 tail of i: 12.0 work load_i: 120.0	work load gap_i: 0 gama_i0: 0.0 work load gap_i: 0	gama_i1: 3.0
			duration	_time_i: 3.0		demand_i: 120.0	work load_i: 120.0	work load gap_i: 0	
252	Algorithm	fini	ched and	the total CPU	Ltime: 36	57 e			
254	End	11111	sneu anu	the total CPU	time. 30	37 S			
255	End								