```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=51124
2
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')
  Backend TkAgg is interactive backend. Turning interactive mode on.
   Waiting 1s.....
12
13
  This is the R_4_3 _standard_test.xlsx optimization process solved by ENSGA-II algorithm.
14
15
   Start
16
17
   Before iteration:
18
     Read basic data
19
     Parameter setting:
20
       trail = 58
21
       Pop\_size = 30
       Tolerance iteration unchanged number = 10
23
       Chrom\_size = 12
       Iter_num_GA = 300
24
25
       Select_rate = 0.85
26
       Crossover rate = 0.95
       Mutation rate = 0.95
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] = 20.40 temp_best_value_gen = 20.40
36
     The No. 0 iteration is finished!
37
38
39
   Beging the No. 1 iteration:
     obj[gen-1] = 20.40 temp_best_value_gen = 20.40
40
41
     No, maintain solution and obj[gen] = 20.40, and the tolerance_counter = 1
42
     solution chromosome =
43
       first level: [ [ 2. 6.5 10.5 16. ]
       second level: [7. 4. 0. 3.]
44
       third level: [2. 4. 3. 7.]]
45
46
     The No. 1 iteration is finished!
47
48
   Beging the No. 2 iteration:
     obj[gen-1] = 20.40 temp_best_value_gen = 18.60
49
50
     Yes, update solution and obj[gen] = 18.60
51
     solution chromosome =
52
       first level: [ 2. 6.5 16. 10.5]
53
       second level: [2. 6. 1. 8.]
54
       third level: [2. 3. 3. 3.]]
55
     The No. 2 iteration is finished!
56
57
   Beging the No. 3 iteration:
58
     obi[gen-1] = 18.60 temp best value gen = 10.30
59
     Yes, update solution and obj[gen] = 10.30
60
     solution chromosome =
       first level: [ [ 2. 6.5 10.5 16. ]
61
       second level: [1. 4. 0. 3.]
62
63
       third level: [4. 4. 3. 7.]]
     The No. 3 iteration is finished!
64
65
   Beging the No. 4 iteration:
66
67
     obj[gen-1] = 10.30 temp_best_value_gen = 10.30
68
     No, maintain solution and obj[gen] = 10.30, and the tolerance_counter = 1
69
     solution chromosome =
       first level: [ [ 2. 6.5 10.5 16. ]
70
       second level: [1. 4. 0. 3.]
71
       third level: [4. 4. 3. 7.]]
73
     The No. 4 iteration is finished!
74
75
   Beging the No. 5 iteration:
     obi[gen-1] = 10.30 temp best value gen = 10.30
76
     No, maintain solution and obj[gen] = 10.30, and the tolerance_counter = 2
77
78
     solution chromosome =
       first level: [ [ 2. 6.5 10.5 16. ]
```

```
second level: [1, 4, 0, 3,]
 80
 81
          third level: [4. 4. 3. 7.]]
 82
        The No. 5 iteration is finished!
 83
     Beging the No. 6 iteration:
 85
        obj[gen-1] = 10.30 temp best value gen = 10.30
        No, maintain solution and obj[gen] = 10.30, and the tolerance_counter = 3
 86
 87
        solution chromosome =
 88
          first level: [ [ 2. 6.5 10.5 16. ]
          second level: [1, 4, 0, 3,]
 89
 90
          third level: [4. 4. 3. 7.]]
 91
        The No. 6 iteration is finished!
 92
 93 Beging the No. 7 iteration:
 94
        obj[gen-1] = 10.30 temp_best_value_gen = 10.30
 95
        No, maintain solution and obj[gen] = 10.30, and the tolerance_counter = 4
 96
        solution chromosome =
          first level: [ [ 2. 6.5 10.5 16. ] second level: [1. 4. 0. 3.]
 97
 98
 99
          third level: [4. 4. 3. 7.]]
100
        The No. 7 iteration is finished!
101
102 Beging the No. 8 iteration:
        obj[gen-1] = 10.30 temp best value gen = 10.30
103
104
        No, maintain solution and obj[gen] = 10.30, and the tolerance_counter = 5
105
        solution chromosome =
          first level: [ 2. 6.5 10.5 16. ]
106
107
          second level: [1. 4. 0. 3.]
108
          third level: [4. 4. 3. 7.]]
109
        The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112
        obj[gen-1] = 10.30 temp_best_value_gen = 10.30
113
        No, maintain solution and obj[gen] = 10.30, and the tolerance_counter = 6
        solution chromosome =
114
          first level: [ [ 2. 6.5 10.5 16. ]
115
          second level: [1. 4. 0. 3.]
116
          third level: [4, 4, 3, 7,]]
117
118
        The No. 9 iteration is finished!
119
120 Beging the No. 10 iteration:
        obj[gen-1] = 10.30 temp_best_value_gen = 10.30
121
        No, maintain solution and obj[gen] = 10.30, and the tolerance_counter = 7
122
123
        solution chromosome =
124
          first level: [ [ 2. 6.5 10.5 16. ]
          second level: [1. 4. 0. 3.]
125
126
          third level: [4. 4. 3. 7.]]
127
        The No. 10 iteration is finished!
128
129 Beging the No. 11 iteration:
130
        obj[gen-1] = 10.30 temp_best_value_gen = 10.30
131
        No, maintain solution and obj[gen] = 10.30, and the tolerance_counter = 8
132
        solution chromosome =
          first level: [ [ 2. 6.5 10.5 16. ]
133
134
          second level: [1. 4. 0. 3.]
135
          third level: [4, 4, 3, 7,]]
       The No. 11 iteration is finished!
136
137
138 Beging the No. 12 iteration:
139
        obj[gen-1] = 10.30 temp_best_value_gen = 10.30
140
        No, maintain solution and obj[gen] = 10.30, and the tolerance_counter = 9
141
        solution chromosome =
142
          first level: [ [ 2. 6.5 10.5 16. ]
143
          second level: [1. 4. 0. 3.]
          third level: [4. 4. 3. 7.]]
144
145
        The No. 12 iteration is finished!
146
147 Beging the No. 13 iteration:
148
        obj[gen-1] = 10.30 temp_best_value_gen = 10.30
149
        No, maintain solution and obj[gen] = 10.30, and the tolerance_counter = 10
150
        solution chromosome =
151
          first level: [ [ 2. 6.5 10.5 16. ]
152
          second level: [1. 4. 0. 3.]
153
          third level: [4, 4, 3, 7,]]
154
       The No. 13 iteration is finished!
155
156
157
158 The iteration is terminated and then visulize the solution:
159
        solution chromosome =
160
          first level: [ [ 2. 6.5 10.5 16. ]
          second level: [1. 4. 0. 3.]
161
162
          third level: [4. 4. 3. 7.]]
        Objective function values and some other indicators:
163
```

unknown							
164	Obj0 = 5	.00 Obj $1 = 8.00$	Obj0 + O	bj1 = 13.00			
165	Total movement of crane: 0.00						
166	Total waiting time in berth position: 8.00						
167	7 Total index of q during berthing: 143.00						
168	168 Specific arrangement for each vessel:						
169	V_id: 0	li: 4.0	xi: 2.0	bow of i: 0.0	tail of i: 4.0	gama_i0: 1.0	gama_i1: 3.0
		duration_time_i: 2.0	demand_i: 140.0		work load_i: 140.0	work load gap_i: 0	
170	V_id: 1	li: 5.0	xi: 6.5		tail of i: 9.0	gama_i0: 4.0	gama_i1: 6.0
		duration_time_i: 2.0	demand_i	: 100.0	work load_i: 100.0	work load gap_i: 0	
171	V_id: 2	1i: 3.0		bow of i: 9.0		gama_i0: 0.0	gama_i1: 3
	.0	duration_time_i: 3.0	demand	d_i: 140.0	work load_i: 140.0	work load gap_i: 0	
172	V_id: 3	li: 8.0		bow of i: 12.	0 tail of i: 20.0	gama_i0: 3.0	gama_i1: 4
	.0	duration_time_i: 1.0	demand	d_i: 60.0	work load_i: 60.0	work load gap_i: 0	
173	173						
174 Algorithm finished and the total CPU time: 620 s							
175 End							
176							