```
exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=52227
 2
     import sys; print
('Python %s on %s' % (sys.version, sys.platform))
 3
     01_My_Python_Code', 'E:/1 \\ \text{0} \\ \
     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_8_8 standard_test.xlsx optimization process solved by ENSGA-II algorithm.
14
15
     Start
16
17
     Before iteration:
         Read basic data
18
19
         Parameter setting:
20
             trail = 58
21
             Pop_size = 30
             Tolerance iteration unchanged number = 10
23
             Chrom\_size = 24
            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
34
     Iteration begin:
35
     Beging the No. 0 iteration:
         obj[0] = 27.20 temp_best_value_gen = 27.20
36
         The No. 0 iteration is finished!
37
38
39
     Beging the No. 1 iteration:
         obj[gen-1] = 27.20 temp_best_value_gen = 27.20
40
         No, maintain solution and obj[gen] = \overline{27.20}, and the tolerance_counter = 1
41
42
         solution chromosome =
43
             first level: [ [ 1.5 5. 10.5 17.5 25.5 28. 3. 3.5]
             second level: [7. 0. 2. 4. 2. 1. 2. 4.]
44
            third level: [2. 4. 6. 2. 6. 4. 4. 5.]]
45
46
         The No. 1 iteration is finished!
47
     Beging the No. 2 iteration:
obj[gen-1] = 27.20 temp_best_value_gen = 27.20
48
49
50
         No, maintain solution and obj[gen] = 27.20, and the tolerance_counter = 2
51
         solution chromosome =
52
             first level: [ [ 1.5 5. 10.5 17.5 25.5 28. 3. 3.5]
53
             second level: [7. 0. 2. 4. 2. 1. 2. 4.]
54
            third level: [2. 4. 6. 2. 6. 4. 4. 5.]]
55
         The No. 2 iteration is finished!
56
57
     Beging the No. 3 iteration:
58
         obi[gen-1] = 27.20 temp best value gen = 27.20
         No, maintain solution and obj[gen] = \overline{27.20}, and the tolerance_counter = 3
59
60
         solution chromosome =
61
             first level: [ [ 1.5 5. 10.5 17.5 25.5 28. 3. 3.5]
62
             second level: [7. 0. 2. 4. 2. 1. 2. 4.]
            third level: [2. 4. 6. 2. 6. 4. 4. 5.]]
63
         The No. 3 iteration is finished!
64
65
     Beging the No. 4 iteration:
66
67
         obj[gen-1] = 27.20 temp_best_value_gen = 27.20
68
         No, maintain solution and obj[gen] = 27.20, and the tolerance_counter = 4
69
         solution chromosome =
             first level: [ [ 1.5 5. 10.5 17.5 25.5 28. 3. 3.5]
70
71
             second level: [7. 0. 2. 4. 2. 1. 2. 4.]
             third level: [2. 4. 6. 2. 6. 4. 4. 5.]]
73
         The No. 4 iteration is finished!
74
75
     Beging the No. 5 iteration:
         obi[gen-1] = 27.20 temp best value gen = 24.40
76
         Yes, update solution and obj[gen] = 24.40
77
78
         solution chromosome =
             first level: [ [ 1.5 5. 10.5 17.5 25.5 25.5 3. 3.5]
79
```

```
second level: [7. 0. 2. 4. 1. 3. 2. 4.]
 80
          third level: [2. 4. 6. 2. 4. 4. 4. 5.]]
 81
 82
        The No. 5 iteration is finished!
 83
 84 Beging the No. 6 iteration:
       obj[gen-1] = 24.40 temp best value gen = 24.40
No, maintain solution and obj[gen] = 24.40, and the tolerance_counter = 1
 85
 86
 87
        solution chromosome =
 88
          first level: [ [ 1.5 5. 10.5 17.5 25.5 25.5 3. 3.5]
          second level: [7. 0. 2. 4. 1. 3. 2. 4.]
 89
 90
          third level: [2. 4. 6. 2. 4. 4. 4. 5.]]
 91
        The No. 6 iteration is finished!
 92
 93 Beging the No. 7 iteration:
        obj[gen-1] = 24.40 temp_best_value_gen = 24.40
 94
 95
        No, maintain solution and obj[gen] = 24.40, and the tolerance_counter = 2
 96
        solution chromosome =
 97
          first level: [ [ 1.5 5. 10.5 17.5 25.5 25.5 3. 3.5]
 98
          second level: [7. 0. 2. 4. 1. 3. 2. 4.]
 99
          third level: [2. 4. 6. 2. 4. 4. 4. 5.]]
100
        The No. 7 iteration is finished!
101
102 Beging the No. 8 iteration:
        obj[gen-1] = 24.40 temp best value gen = 24.40
103
104
        No, maintain solution and obj[gen] = 24.40, and the tolerance_counter = 3
105
        solution chromosome =
          first level: [ [ 1.5 5. 10.5 17.5 25.5 25.5 3. 3.5]
106
          second level: [7. 0. 2. 4. 1. 3. 2. 4.]
107
          third level: [2. 4. 6. 2. 4. 4. 4. 5.]]
108
109
        The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112
        obj[gen-1] = 24.40 temp_best_value_gen = 24.40
113
        No, maintain solution and obj[gen] = 24.40, and the tolerance_counter = 4
        solution chromosome =
114
115
          first level: [ [ 1.5 5. 10.5 17.5 25.5 25.5 3. 3.5]
116
          second level: [7. 0. 2. 4. 1. 3. 2. 4.]
          third level: [2. 4. 6. 2. 4. 4. 4. 5.]]
117
        The No. 9 iteration is finished!
118
119
120 Beging the No. 10 iteration:
121
        obj[gen-1] = 24.40 temp\_best\_value\_gen = 24.40
122
        No, maintain solution and obj[gen] = 24.40, and the tolerance_counter = 5
123
        solution chromosome =
124
          first level: [ [ 1.5 5. 10.5 17.5 25.5 25.5 3. 3.5]
125
          second level: [7. 0. 2. 4. 1. 3. 2. 4.]
126
          third level: [2. 4. 6. 2. 4. 4. 4. 5.]]
127
        The No. 10 iteration is finished!
128
129 Beging the No. 11 iteration:
        obj[gen-1] = 24.40 temp_best_value_gen = 24.40
130
131
        No, maintain solution and obj[gen] = 24.40, and the tolerance_counter = 6
132
        solution chromosome =
          first level: [ [ 1.5 5. 10.5 17.5 25.5 25.5 3. 3.5]
133
134
          second level: [7. 0. 2. 4. 1. 3. 2. 4.]
          third level: [2. 4. 6. 2. 4. 4. 4. 5.]]
135
136
       The No. 11 iteration is finished!
137
138 Beging the No. 12 iteration:
139
        obj[gen-1] = 24.40 temp_best_value_gen = 24.40
140
        No, maintain solution and obj[gen] = 24.40, and the tolerance_counter = 7
141
        solution chromosome =
          first level: [ [ 1.5 5. 10.5 17.5 25.5 25.5 3. 3.5]
142
          second level: [7. 0. 2. 4. 1. 3. 2. 4.]
143
          third level: [2. 4. 6. 2. 4. 4. 4. 5.]]
144
145
        The No. 12 iteration is finished!
146
147 Beging the No. 13 iteration:
        obj[gen-1] = 24.40 temp_best_value_gen = 24.40
148
149
        No, maintain solution and obj[gen] = 24.40, and the tolerance_counter = 8
150
        solution chromosome =
151
          first level: [ [ 1.5 5. 10.5 17.5 25.5 25.5 3. 3.5]
152
          second level: [7. 0. 2. 4. 1. 3. 2. 4.]
          third level: [2. 4. 6. 2. 4. 4. 4. 5.]]
153
154
        The No. 13 iteration is finished!
155
156
157
158 The iteration is terminated and then visulize the solution:
159
        solution chromosome =
          first level: [ [ 1.5   5.   10.5   17.5   25.5   25.5   3.   3.5]
160
          second level: [7. 0. 2. 4. 1. 3. 2. 4.]
161
162
          third level: [2. 4. 6. 2. 4. 4. 4. 5.]]
        Objective function values and some other indicators:
163
```

unkne	own							
164	Obj0 = 1	0.00 Obj1 = 54.00	Obj0 + Ob	j1 = 64.00				
165	Total movement of crane: 31.00							
166	Total wa	Total waiting time in berth position: 23.00						
167	Total index of q during berthing: 341.00							
168	Specific arrangement for each vessel:							
169	V_id: 0	li: 3.0	xi: 1.5	bow of i: 0.0	tail of i: 3.0	gama_i0: 7.0	gama_i1: 11.0	
		duration_time_i: 4.0	demand_i:	140.0	work load_i: 140.0 tail of i: 7.0	work load gap_i: 0		
170	V_id: 1	li: 4.0	xi: 5.0	bow of i: 3.0	tail of i: 7.0	gama_i0: 0.0	gama_i1: 2.0	
		duration_time_i: 2.0	demand_i:	100.0	work load_i: 100.0 0 tail of i: 14.0	work load gap_i: 0		
171	V_id: 2	li: 7.0	xi: 10.5	bow of i: 7.	0 tail of i: 14.0	gama_i0: 2.0	gama_i1: 3	
	.0	duration_time_i: 1.0	demand	_i: 80.0	work load_i: 80.0			
172		li: 7.0	xi: 17.5		4.0 tail of i: 21.0	gama_i0: 4.0	gama_i1: 6	
	.0	duration_time_i: 2.0	demand	_i: 80.0	work load_i: 80.0	work load gap_i: 0		
173		1i: 9.0	vi: 25.5	how of it 21	1.0 tail of i: 30.0	gama_i0:10	gama_i1: 3	
	.0	duration_time_i: 2.0	demand	_i: 140.0	work load_i: 140.0 3.5 tail of i: 27.5	work load gap_i: 0		
174		li: 4.0	xi: 25.5	bow of i: 23	3.5 tail of i: 27.5	gama_i0: 3.0	gama_i1: 4	
	.0	duration_time_i: 1.0	demand	_i: 60.0	work load_i: 60.0	work load gap_i: 0		
175	V_id: 6	li: 6.0	xi: 3.0	bow of i: 0.0	tail of i: 6.0	gama_i0: 2.0	gama_i1: 4.0	
		duration_time_i: 2.0	demand_i:	100.0	work load_i: 100.0	work load gap_i: 0		
176	V_id: 7				tail of i: 7.0		gama_i1: 6.0	
		duration_time_i: 2.0	demand_i:	140.0	work load_i: 140.0	work load gap_i: 0		
177								
	Algorithm finished and the total CPU time: 1222 s							
	End							
180								