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1 "E:\1 \0000\3 \0000\1 \0000\1 \0000\1 \0000\1_LW_\0000\2\6 \0000\2 python code\01_My_Python_Code\Scripts\python.
   exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=8478
2
3 import sys; print('Python %s on %s' % (sys.version, sys.platform))
4 sys.path.extend(['E:\1 \0000\3 \0000\1 \0000\1 \0000\1 \0000\1_LW_\0000\2\6 \0000\2 python code\
   01_My_Python_Code', 'E:\1 \0000\3 \0000\1 \0000\1 \0000\1 \0000\1_LW_\0000\2\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 \0000\3 \0000\1 \0000\1 \0000\1 \0000\1_LW_\0000\2\6 \0000\2 python code\01_My_Python_Code\
   main_BACASP_official_ENSGA-II.py', wdir='E:\1 \0000\3 \0000\1 \0000\1 \0000\1 \0000\1_LW_\0000\2\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_2_1_standerd_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 = 29
21     Pop_size = 20
22     Tolerance_iteration_unchanged_number = 8
23     Chrom_size = 6
24     Iter_num_GA = 300
25     Select_rate = 0.9
26     Crossover_rate = 0.75
27     Mutation rate = 0.75
28     Mu_oper_type = 1
29     vessel_move_way = 2
30     coefficient for Obj1= 1.9
31     coefficient for Obj2= 0.10000000000000009
32     gen = 0
33
34 Iteration begin:
35 Beging the No. 0 iteration:
36   obj[0] = 8.61   temp_best_value_gen = 8.61
37   The No. 0 iteration is finished!
38
39 Beging the No. 1 iteration:
40   obj[gen-1] = 8.61   temp_best_value_gen = 8.61
41   No, maintain solution and obj[gen] = 8.61 , and the tolerance_counter = 1
42   solution chromosome =
43     first level: [ 2.57 5.51]
44     second level: [0. 3.]
45     third level: [3. 8.] ]
46   The No. 1 iteration is finished!
47
48 Beging the No. 2 iteration:
49   obj[gen-1] = 8.61   temp_best_value_gen = 8.61
50   No, maintain solution and obj[gen] = 8.61 , and the tolerance_counter = 2
51   solution chromosome =
52     first level: [ 2.57 5.51]
53     second level: [0. 3.]
54     third level: [3. 8.] ]
55   The No. 2 iteration is finished!
56
57 Beging the No. 3 iteration:
58   obj[gen-1] = 8.61   temp_best_value_gen = 6.00
59   Yes, update solution and obj[gen] = 6.00
60   solution chromosome =
61     first level: [ 2. 8.]
62     second level: [0. 3.]
63     third level: [3. 8.] ]
64   The No. 3 iteration is finished!
65
66 Beging the No. 4 iteration:
67   obj[gen-1] = 6.00   temp_best_value_gen = 6.00
68   No, maintain solution and obj[gen] = 6.00 , and the tolerance_counter = 1
69   solution chromosome =
70     first level: [ 2. 8.]
71     second level: [0. 3.]
72     third level: [3. 8.] ]
73   The No. 4 iteration is finished!
74
75 Beging the No. 5 iteration:
76   obj[gen-1] = 6.00   temp_best_value_gen = 3.90
77   Yes, update solution and obj[gen] = 3.90
78   solution chromosome =
79     first level: [ 2. 8.]

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80     second level: [0. 1.]
81     third level: [3. 4.] ]
82     The No. 5 iteration is finished!
83
84 Beging the No. 6 iteration:
85     obj[gen-1] = 3.90     temp_best_value_gen = 3.90
86     No, maintain solution and obj[gen] = 3.90 , and the tolerance_counter = 1
87     solution chromosome =
88     first level: [ [2. 8.]
89     second level: [0. 1.]
90     third level: [3. 4.] ]
91     The No. 6 iteration is finished!
92
93 Beging the No. 7 iteration:
94     obj[gen-1] = 3.90     temp_best_value_gen = 3.90
95     No, maintain solution and obj[gen] = 3.90 , and the tolerance_counter = 2
96     solution chromosome =
97     first level: [ [2. 8.]
98     second level: [0. 1.]
99     third level: [3. 4.] ]
100    The No. 7 iteration is finished!
101
102 Beging the No. 8 iteration:
103     obj[gen-1] = 3.90     temp_best_value_gen = 3.90
104     No, maintain solution and obj[gen] = 3.90 , and the tolerance_counter = 3
105     solution chromosome =
106     first level: [ [2. 8.]
107     second level: [0. 1.]
108     third level: [3. 4.] ]
109     The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112     obj[gen-1] = 3.90     temp_best_value_gen = 3.90
113     No, maintain solution and obj[gen] = 3.90 , and the tolerance_counter = 4
114     solution chromosome =
115     first level: [ [2. 8.]
116     second level: [0. 1.]
117     third level: [3. 4.] ]
118     The No. 9 iteration is finished!
119
120 Beging the No. 10 iteration:
121     obj[gen-1] = 3.90     temp_best_value_gen = 3.90
122     No, maintain solution and obj[gen] = 3.90 , and the tolerance_counter = 5
123     solution chromosome =
124     first level: [ [2. 8.]
125     second level: [0. 1.]
126     third level: [3. 4.] ]
127     The No. 10 iteration is finished!
128
129 Beging the No. 11 iteration:
130     obj[gen-1] = 3.90     temp_best_value_gen = 3.90
131     No, maintain solution and obj[gen] = 3.90 , and the tolerance_counter = 6
132     solution chromosome =
133     first level: [ [2. 8.]
134     second level: [0. 1.]
135     third level: [3. 4.] ]
136     The No. 11 iteration is finished!
137
138 Beging the No. 12 iteration:
139     obj[gen-1] = 3.90     temp_best_value_gen = 3.90
140     No, maintain solution and obj[gen] = 3.90 , and the tolerance_counter = 7
141     solution chromosome =
142     first level: [ [2. 8.]
143     second level: [0. 1.]
144     third level: [3. 4.] ]
145     The No. 12 iteration is finished!
146
147 Beging the No. 13 iteration:
148     obj[gen-1] = 3.90     temp_best_value_gen = 3.90
149     No, maintain solution and obj[gen] = 3.90 , and the tolerance_counter = 8
150     solution chromosome =
151     first level: [ [2. 8.]
152     second level: [0. 1.]
153     third level: [3. 4.] ]
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. 8.]
161     second level: [0. 1.]
162     third level: [3. 4.] ]
163     Objective function values and some other indicators:

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unknown

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164      Obj0 = 2.00      Obj1 = 1.00      Obj0 + Obj1 = 3.00
165      Total movement of crane: 0.00
166      Total waiting time in berth position: 1.00
167      Total index of q during berthing: 38.00
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: 0.0      gama_i1: 3.0
170      duration_time_i: 3.0      demand_i: 160.0      work load_i: 160.0      work load gap_i: 0
171      V_id: 1      li: 8.0      xi: 8.0      bow of i: 4.0      tail of i: 12.0      gama_i0: 1.0      gama_i1: 3.0
172      duration_time_i: 2.0      demand_i: 120.0      work load_i: 120.0      work load gap_i: 0
173      Algorithm finished and the total CPU time: 225 s
174      End
```