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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=3992
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_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_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 = 40
21     Pop_size = 10
22     Tolerance_iteration_unchanged_number = 8
23     Chrom_size = 6
24     Iter_num_GA = 300
25     Select_rate = 0.9
26     Crossover_rate = 0.95
27     Mutation rate = 0.9
28     Mu_oper_type = 1
29     vessel_move_way = 1
30     coefficient for Obj1= 0.5
31     coefficient for Obj2= 1.5
32     gen = 0
33
34 Iteration begin:
35 Beging the No. 0 iteration:
36   obj[0] = 11.00   temp_best_value_gen = 11.00
37   The No. 0 iteration is finished!
38
39 Beging the No. 1 iteration:
40   obj[gen-1] = 11.00   temp_best_value_gen = 8.00
41   Yes, update solution and obj[gen] = 8.00
42   solution chromosome =
43     first level: [ [8. 4.]
44     second level: [1. 3.]
45     third level: [4. 3.] ]
46   The No. 1 iteration is finished!
47
48 Beging the No. 2 iteration:
49   obj[gen-1] = 8.00   temp_best_value_gen = 8.00
50   No, maintain solution and obj[gen] = 8.00 , and the tolerance_counter = 1
51   solution chromosome =
52     first level: [ [8. 4.]
53     second level: [1. 3.]
54     third level: [4. 3.] ]
55   The No. 2 iteration is finished!
56
57 Beging the No. 3 iteration:
58   obj[gen-1] = 8.00   temp_best_value_gen = 6.50
59   Yes, update solution and obj[gen] = 6.50
60   solution chromosome =
61     first level: [ [8. 4.]
62     second level: [0. 3.]
63     third level: [3. 3.] ]
64   The No. 3 iteration is finished!
65
66 Beging the No. 4 iteration:
67   obj[gen-1] = 6.50   temp_best_value_gen = 6.50
68   No, maintain solution and obj[gen] = 6.50 , and the tolerance_counter = 1
69   solution chromosome =
70     first level: [ [8. 4.]
71     second level: [0. 3.]
72     third level: [3. 3.] ]
73   The No. 4 iteration is finished!
74
75 Beging the No. 5 iteration:
76   obj[gen-1] = 6.50   temp_best_value_gen = 6.50
77   No, maintain solution and obj[gen] = 6.50 , and the tolerance_counter = 2
78   solution chromosome =
79     first level: [ [8. 4.]

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80     second level: [0. 3.]
81     third level: [3. 3.] ]
82     The No. 5 iteration is finished!
83
84 Beging the No. 6 iteration:
85     obj[gen-1] = 6.50    temp_best_value_gen = 6.50
86     No, maintain solution and obj[gen] = 6.50 , and the tolerance_counter = 3
87     solution chromosome =
88         first level: [ [8. 4.]
89         second level: [0. 3.]
90         third level: [3. 3.] ]
91     The No. 6 iteration is finished!
92
93 Beging the No. 7 iteration:
94     obj[gen-1] = 6.50    temp_best_value_gen = 6.50
95     No, maintain solution and obj[gen] = 6.50 , and the tolerance_counter = 4
96     solution chromosome =
97         first level: [ [8. 4.]
98         second level: [0. 3.]
99         third level: [3. 3.] ]
100    The No. 7 iteration is finished!
101
102 Beging the No. 8 iteration:
103     obj[gen-1] = 6.50    temp_best_value_gen = 6.50
104     No, maintain solution and obj[gen] = 6.50 , and the tolerance_counter = 5
105     solution chromosome =
106         first level: [ [8. 4.]
107         second level: [0. 3.]
108         third level: [3. 3.] ]
109    The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112     obj[gen-1] = 6.50    temp_best_value_gen = 6.50
113     No, maintain solution and obj[gen] = 6.50 , and the tolerance_counter = 6
114     solution chromosome =
115         first level: [ [8. 4.]
116         second level: [0. 3.]
117         third level: [3. 3.] ]
118    The No. 9 iteration is finished!
119
120 Beging the No. 10 iteration:
121     obj[gen-1] = 6.50    temp_best_value_gen = 6.50
122     No, maintain solution and obj[gen] = 6.50 , and the tolerance_counter = 7
123     solution chromosome =
124         first level: [ [8. 4.]
125         second level: [0. 3.]
126         third level: [3. 3.] ]
127    The No. 10 iteration is finished!
128
129 Beging the No. 11 iteration:
130     obj[gen-1] = 6.50    temp_best_value_gen = 6.50
131     No, maintain solution and obj[gen] = 6.50 , and the tolerance_counter = 8
132     solution chromosome =
133         first level: [ [8. 4.]
134         second level: [0. 3.]
135         third level: [3. 3.] ]
136    The No. 11 iteration is finished!
137
138
139 -----
140 The iteration is terminated and then visulize the solution:
141     solution chromosome =
142         first level: [ [8. 4.]
143         second level: [0. 3.]
144         third level: [3. 3.] ]
145 Objective function values and some other indicators:
146     Obj0 = 4.00          Obj1 = 3.00          Obj0 + Obj1 = 7.00
147     Total movement of crane: 0.00
148     Total waiting time in berth position: 3.00
149     Total index of q during berthing: 61.00
150 Specific arrangement for each vessel:
151     V_id: 0             li: 4.0             xi: 8.0             bow of i: 6.0             tail of i: 10.0             gama_i0: 0.0             gama_i1: 3.0
152     duration_time_i: 3.0             demand_i: 160.0             work load_i: 160.0             work load gap_i: 0
153     V_id: 1             li: 8.0             xi: 4.0             bow of i: 0.0             tail of i: 8.0             gama_i0: 3.0             gama_i1: 5.0
154     duration_time_i: 2.0             demand_i: 120.0             work load_i: 120.0             work load gap_i: 0
155
154 Algorithm finished and the total CPU time: 93 s
155 End
156

```