```
 1  "E:\1 □□□□\3 □□□□□\1 □□□□□□□\1 □□□□□□□□\1_□□□□□□_□□□□\1_LW_□□□□2\6 □□□□\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=36388
 2
 3  import sys; print('Python %s on %s' % (sys.version, sys.platform))
 4  sys.path.extend(['E:\\1 □□□□\\3 □□□□□\\1 □□□□□□□\\1 □□□□□□□□\\1_□□□□□□_□□□□\\1_LW_□□□□2\\6 □□□□\\2 python code\\
    01_My_Python_Code', 'E:/1 □□□□/3 □□□□□/1 □□□□□□□/1 □□□□□□□□/1_□□□□□□_□□□□/1_LW_□□□□2/6 □□□□/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 □□□□/3 □□□□□/1 □□□□□□□/1 □□□□□□□□/1_□□□□□□_□□□□/1_LW_□□□□2/6 □□□□/2 python code/01_My_Python_Code/
    main_BACASP_official_ENSGA-II.py', wdir='E:/1 □□□□/3 □□□□□/1 □□□□□□□/1 □□□□□□□□/1_□□□□□□_□□□□/1_LW_□□□□2/6 □□□□/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 =  13
21          Pop_size =  20
22          Tolerance_iteration_unchanged_number =  5
23          Chrom_size =  6
24          Iter_num_GA =  300
25          Select_rate =  0.75
26          Crossover_rate =  0.8
27          Mutation rate =  0.9
28          Mu_oper_type =  2
29          vessel_move_way =  2
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] = 8.59    temp_best_value_gen = 8.59
37      The No. 0  iteration is finished!
38
39  Beging the No. 1  iteration:
40      obj[gen-1] = 8.59     temp_best_value_gen = 8.59
41      No, maintain solution  and obj[gen] = 8.59 , and the tolerance_counter = 1
42      solution chromosome =
43          first level: [ [2.   4.09]
44          second level:  [1. 0.]
45          third level:  [4. 8.] ]
46      The No. 1  iteration is finished!
47
48  Beging the No. 2  iteration:
49      obj[gen-1] = 8.59     temp_best_value_gen = 8.59
50      No, maintain solution  and obj[gen] = 8.59 , and the tolerance_counter = 2
51      solution chromosome =
52          first level: [ [2.   4.09]
53          second level:  [1. 0.]
54          third level:  [4. 8.] ]
55      The No. 2  iteration is finished!
56
57  Beging the No. 3  iteration:
58      obj[gen-1] = 8.59     temp_best_value_gen = 8.59
59      No, maintain solution  and obj[gen] = 8.59 , and the tolerance_counter = 3
60      solution chromosome =
61          first level: [ [2.   4.09]
62          second level:  [1. 0.]
63          third level:  [4. 8.] ]
64      The No. 3  iteration is finished!
65
66  Beging the No. 4  iteration:
67      obj[gen-1] = 8.59     temp_best_value_gen = 8.59
68      No, maintain solution  and obj[gen] = 8.59 , and the tolerance_counter = 4
69      solution chromosome =
70          first level: [ [2.   4.09]
71          second level:  [1. 0.]
72          third level:  [4. 8.] ]
73      The No. 4  iteration is finished!
74
75  Beging the No. 5  iteration:
76      obj[gen-1] = 8.59     temp_best_value_gen = 8.59
77      No, maintain solution  and obj[gen] = 8.59 , and the tolerance_counter = 5
78      solution chromosome =
79          first level: [ [2.   4.09]
```

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80        second level:  [1. 0.]
81        third level:  [4. 8.] ]
82     The No. 5  iteration is finished!
83
84
85   --------------------------------------------------------------------------------
86   The iteration is terminated and then visulize the solution:
87      solution chromosome =
88        first level: [ [2.   4.09]
89        second level:  [1. 0.]
90        third level:  [4. 8.] ]
91      Objective function values and some other indicators:
92        Obj0 = 2.00            Obj1 = 5.06            Obj0 + Obj1 = 7.06
93        Total movement of crane: 4.06
94        Total waiting time in berth position: 1.00
95        Total index of q during berthing: 27.00
96      Specific arrangement for each vessel:
97        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: 160.0          work load_i: 160.0          work load gap_i: 0
98        V_id:  1          li: 8.0          xi: 4.1          bow of i: 0.1          tail of i: 8.1          gama_i0: 0.0          gama_i1: 1.0
                  duration_time_i: 1.0          demand_i: 120.0          work load_i: 120.0          work load gap_i: 0
99
100  Algorithm finished and the total CPU time: 99 s
101  End
102
```