


```

80     second level: [1. 0.]
81     third level: [2. 7.] ]
82     The No. 5 iteration is finished!
83
84     Beging the No. 6 iteration:
85     obj[gen-1] = 6.79     temp_best_value_gen = 6.79
86     No, maintain solution and obj[gen] = 6.79 , and the tolerance_counter = 3
87     solution chromosome =
88     first level: [ [3.15 4.03]
89     second level: [1. 0.]
90     third level: [2. 7.] ]
91     The No. 6 iteration is finished!
92
93     Beging the No. 7 iteration:
94     obj[gen-1] = 6.79     temp_best_value_gen = 6.79
95     No, maintain solution and obj[gen] = 6.79 , and the tolerance_counter = 4
96     solution chromosome =
97     first level: [ [3.15 4.03]
98     second level: [1. 0.]
99     third level: [2. 7.] ]
100    The No. 7 iteration is finished!
101
102    Beging the No. 8 iteration:
103    obj[gen-1] = 6.79     temp_best_value_gen = 6.79
104    No, maintain solution and obj[gen] = 6.79 , and the tolerance_counter = 5
105    solution chromosome =
106    first level: [ [3.15 4.03]
107    second level: [1. 0.]
108    third level: [2. 7.] ]
109    The No. 8 iteration is finished!
110
111    Beging the No. 9 iteration:
112    obj[gen-1] = 6.79     temp_best_value_gen = 6.79
113    No, maintain solution and obj[gen] = 6.79 , and the tolerance_counter = 6
114    solution chromosome =
115    first level: [ [3.15 4.03]
116    second level: [1. 0.]
117    third level: [2. 7.] ]
118    The No. 9 iteration is finished!
119
120    Beging the No. 10 iteration:
121    obj[gen-1] = 6.79     temp_best_value_gen = 6.79
122    No, maintain solution and obj[gen] = 6.79 , and the tolerance_counter = 7
123    solution chromosome =
124    first level: [ [3.15 4.03]
125    second level: [1. 0.]
126    third level: [2. 7.] ]
127    The No. 10 iteration is finished!
128
129    Beging the No. 11 iteration:
130    obj[gen-1] = 6.79     temp_best_value_gen = 6.79
131    No, maintain solution and obj[gen] = 6.79 , and the tolerance_counter = 8
132    solution chromosome =
133    first level: [ [3.15 4.03]
134    second level: [1. 0.]
135    third level: [2. 7.] ]
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: [ [3.15 4.03]
143 second level: [1. 0.]
144 third level: [2. 7.] ]
145 Objective function values and some other indicators:
146 Obj0 = 4.00      Obj1 = 2.79      Obj0 + Obj1 = 6.79
147 Total movement of crane: 1.79
148 Total waiting time in berth position: 1.00
149 Total index of q during berthing: 27.00
150 Specific arrangement for each vessel:
151 V_id: 0          li: 4.0          xi: 3.1          bow of i: 1.1          tail of i: 5.1          gama_i0: 1.0          gama_i1: 5.0
152          duration_time_i: 4.0          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: 0.0          gama_i1: 1.0
154          duration_time_i: 1.0          demand_i: 120.0          work load_i: 120.0          work load gap_i: 0
155
156 Algorithm finished and the total CPU time: 433 s
157 End
158

```