



```

80     second level: [1. 0.]
81     third level: [4. 7.] ]
82     The No. 5 iteration is finished!
83
84 Beging the No. 6 iteration:
85     obj[gen-1] = 5.24     temp_best_value_gen = 5.24
86     No, maintain solution and obj[gen] = 5.24 , and the tolerance_counter = 1
87     solution chromosome =
88         first level: [ 2.2  4.05]
89         second level: [1. 0.]
90         third level: [4. 7.] ]
91     The No. 6 iteration is finished!
92
93 Beging the No. 7 iteration:
94     obj[gen-1] = 5.24     temp_best_value_gen = 5.24
95     No, maintain solution and obj[gen] = 5.24 , and the tolerance_counter = 2
96     solution chromosome =
97         first level: [ 2.2  4.05]
98         second level: [1. 0.]
99         third level: [4. 7.] ]
100    The No. 7 iteration is finished!
101
102 Beging the No. 8 iteration:
103     obj[gen-1] = 5.24     temp_best_value_gen = 5.24
104     No, maintain solution and obj[gen] = 5.24 , and the tolerance_counter = 3
105     solution chromosome =
106         first level: [ 2.2  4.05]
107         second level: [1. 0.]
108         third level: [4. 7.] ]
109    The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112     obj[gen-1] = 5.24     temp_best_value_gen = 5.24
113     No, maintain solution and obj[gen] = 5.24 , and the tolerance_counter = 4
114     solution chromosome =
115         first level: [ 2.2  4.05]
116         second level: [1. 0.]
117         third level: [4. 7.] ]
118    The No. 9 iteration is finished!
119
120 Beging the No. 10 iteration:
121     obj[gen-1] = 5.24     temp_best_value_gen = 5.24
122     No, maintain solution and obj[gen] = 5.24 , and the tolerance_counter = 5
123     solution chromosome =
124         first level: [ 2.2  4.05]
125         second level: [1. 0.]
126         third level: [4. 7.] ]
127    The No. 10 iteration is finished!
128
129 -----
130
131 The iteration is terminated and then visulize the solution:
132     solution chromosome =
133         first level: [ 2.2  4.05]
134         second level: [1. 0.]
135         third level: [4. 7.] ]
136 Objective function values and some other indicators:
137     Obj0 = 2.00           Obj1 = 4.47           Obj0 + Obj1 = 6.47
138     Total movement of crane: 3.47
139     Total waiting time in berth position: 1.00
140     Total index of q during berthing: 27.00
141     Specific arrangement for each vessel:
142     V_id: 0              li: 4.0              xi: 2.2              bow of i: 0.2              tail of i: 4.2              gama_i0: 1.0              gama_i1: 3.0
143         duration_time_i: 2.0              demand_i: 160.0              work load_i: 160.0              work load gap_i: 0
144     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
145         duration_time_i: 1.0              demand_i: 120.0              work load_i: 120.0              work load gap_i: 0
146
147 Algorithm finished and the total CPU time: 270 s
148 End
149

```