



```

80     second level: [0. 2.]
81     third level: [4. 8.] ]
82     The No. 5 iteration is finished!
83
84 Beging the No. 6 iteration:
85     obj[gen-1] = 5.96     temp_best_value_gen = 5.96
86     No, maintain solution and obj[gen] = 5.96 , and the tolerance_counter = 1
87     solution chromosome =
88         first level: [ [2.09 4.01]
89         second level: [0. 2.]
90         third level: [4. 8.] ]
91     The No. 6 iteration is finished!
92
93 Beging the No. 7 iteration:
94     obj[gen-1] = 5.96     temp_best_value_gen = 5.96
95     No, maintain solution and obj[gen] = 5.96 , and the tolerance_counter = 2
96     solution chromosome =
97         first level: [ [2.09 4.01]
98         second level: [0. 2.]
99         third level: [4. 8.] ]
100    The No. 7 iteration is finished!
101
102 Beging the No. 8 iteration:
103     obj[gen-1] = 5.96     temp_best_value_gen = 5.96
104     No, maintain solution and obj[gen] = 5.96 , and the tolerance_counter = 3
105     solution chromosome =
106         first level: [ [2.09 4.01]
107         second level: [0. 2.]
108         third level: [4. 8.] ]
109    The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112     obj[gen-1] = 5.96     temp_best_value_gen = 5.96
113     No, maintain solution and obj[gen] = 5.96 , and the tolerance_counter = 4
114     solution chromosome =
115         first level: [ [2.09 4.01]
116         second level: [0. 2.]
117         third level: [4. 8.] ]
118    The No. 9 iteration is finished!
119
120 Beging the No. 10 iteration:
121     obj[gen-1] = 5.96     temp_best_value_gen = 5.96
122     No, maintain solution and obj[gen] = 5.96 , and the tolerance_counter = 5
123     solution chromosome =
124         first level: [ [2.09 4.01]
125         second level: [0. 2.]
126         third level: [4. 8.] ]
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: [ [2.09 4.01]
134         second level: [0. 2.]
135         third level: [4. 8.] ]
136 Objective function values and some other indicators:
137     Obj0 = 2.00           Obj1 = 5.92           Obj0 + Obj1 = 7.92
138     Total movement of crane: 3.92
139     Total waiting time in berth position: 2.00
140     Total index of q during berthing: 27.00
141 Specific arrangement for each vessel:
142     V_id: 0             li: 4.0             xi: 2.1             bow of i: 0.1             tail of i: 4.1             gama_i0: 0.0             gama_i1: 2.0
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: 2.0             gama_i1: 3.0
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: 260 s
148 End
149

```