



```

80     second level: [1. 4. 3. 5.]
81     third level: [4. 4. 5. 8.] ]
82     The No. 5 iteration is finished!
83
84     Beging the No. 6 iteration:
85     obj[gen-1] = 13.59 temp_best_value_gen = 13.59
86     No, maintain solution and obj[gen] = 13.59 , and the tolerance_counter = 6
87     solution chromosome =
88     first level: [ 3.25 5.4 3.51 4.83]
89     second level: [1. 4. 3. 5.]
90     third level: [4. 4. 5. 8.] ]
91     The No. 6 iteration is finished!
92
93     Beging the No. 7 iteration:
94     obj[gen-1] = 13.59 temp_best_value_gen = 13.59
95     No, maintain solution and obj[gen] = 13.59 , and the tolerance_counter = 7
96     solution chromosome =
97     first level: [ 3.25 5.4 3.51 4.83]
98     second level: [1. 4. 3. 5.]
99     third level: [4. 4. 5. 8.] ]
100    The No. 7 iteration is finished!
101
102    Beging the No. 8 iteration:
103    obj[gen-1] = 13.59 temp_best_value_gen = 13.59
104    No, maintain solution and obj[gen] = 13.59 , and the tolerance_counter = 8
105    solution chromosome =
106    first level: [ 3.25 5.4 3.51 4.83]
107    second level: [1. 4. 3. 5.]
108    third level: [4. 4. 5. 8.] ]
109    The No. 8 iteration is finished!
110
111    Beging the No. 9 iteration:
112    obj[gen-1] = 13.59 temp_best_value_gen = 13.59
113    No, maintain solution and obj[gen] = 13.59 , and the tolerance_counter = 9
114    solution chromosome =
115    first level: [ 3.25 5.4 3.51 4.83]
116    second level: [1. 4. 3. 5.]
117    third level: [4. 4. 5. 8.] ]
118    The No. 9 iteration is finished!
119
120    Beging the No. 10 iteration:
121    obj[gen-1] = 13.59 temp_best_value_gen = 13.59
122    No, maintain solution and obj[gen] = 13.59 , and the tolerance_counter = 10
123    solution chromosome =
124    first level: [ 3.25 5.4 3.51 4.83]
125    second level: [1. 4. 3. 5.]
126    third level: [4. 4. 5. 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: [ 3.25 5.4 3.51 4.83]
134    second level: [1. 4. 3. 5.]
135    third level: [4. 4. 5. 8.] ]
136    Objective function values and some other indicators:
137    Obj0 = 5.00      Obj1 = 40.89      Obj0 + Obj1 = 45.89
138    Total movement of crane: 27.89
139    Total waiting time in berth position: 13.00
140    Total index of q during berthing: 52.00
141    Specific arrangement for each vessel:
142    V_id: 0          li: 6.0          xi: 3.3          bow of i: 0.3          tail of i: 6.3          gama_i0: 1.0          gama_i1: 3.0
143          duration_time_i: 2.0          demand_i: 140.0          work load_i: 140.0          work load gap_i: 0
144    V_id: 1          li: 4.0          xi: 5.4          bow of i: 3.4          tail of i: 7.4          gama_i0: 4.0          gama_i1: 5.0
145          duration_time_i: 1.0          demand_i: 80.0          work load_i: 80.0          work load gap_i: 0
146    V_id: 2          li: 6.0          xi: 3.5          bow of i: 0.5          tail of i: 6.5          gama_i0: 3.0          gama_i1: 4.0
147          duration_time_i: 1.0          demand_i: 100.0          work load_i: 100.0          work load gap_i: 0
148    V_id: 3          li: 8.0          xi: 4.8          bow of i: 0.8          tail of i: 8.8          gama_i0: 5.0          gama_i1: 6.0
149          duration_time_i: 1.0          demand_i: 120.0          work load_i: 120.0          work load gap_i: 0
150
151    Algorithm finished and the total CPU time: 514 s
152    End
153

```