


```

80     second level: [3. 5. 4. 1. 1.]
81     third level: [2. 3. 2. 2. 6.] ]
82     The No. 5 iteration is finished!
83
84     Beging the No. 6 iteration:
85     obj[gen-1] = 21.60 temp_best_value_gen = 21.60
86     No, maintain solution and obj[gen] = 21.60 , and the tolerance_counter = 5
87     solution chromosome =
88     first level: [ [ 3. 26. 16. 21. 10.]
89     second level: [3. 5. 4. 1. 1.]
90     third level: [2. 3. 2. 2. 6.] ]
91     The No. 6 iteration is finished!
92
93     Beging the No. 7 iteration:
94     obj[gen-1] = 21.60 temp_best_value_gen = 21.60
95     No, maintain solution and obj[gen] = 21.60 , and the tolerance_counter = 6
96     solution chromosome =
97     first level: [ [ 3. 26. 16. 21. 10.]
98     second level: [3. 5. 4. 1. 1.]
99     third level: [2. 3. 2. 2. 6.] ]
100    The No. 7 iteration is finished!
101
102    Beging the No. 8 iteration:
103    obj[gen-1] = 21.60 temp_best_value_gen = 21.60
104    No, maintain solution and obj[gen] = 21.60 , and the tolerance_counter = 7
105    solution chromosome =
106    first level: [ [ 3. 26. 16. 21. 10.]
107    second level: [3. 5. 4. 1. 1.]
108    third level: [2. 3. 2. 2. 6.] ]
109    The No. 8 iteration is finished!
110
111    Beging the No. 9 iteration:
112    obj[gen-1] = 21.60 temp_best_value_gen = 21.60
113    No, maintain solution and obj[gen] = 21.60 , and the tolerance_counter = 8
114    solution chromosome =
115    first level: [ [ 3. 26. 16. 21. 10.]
116    second level: [3. 5. 4. 1. 1.]
117    third level: [2. 3. 2. 2. 6.] ]
118    The No. 9 iteration is finished!
119
120    Beging the No. 10 iteration:
121    obj[gen-1] = 21.60 temp_best_value_gen = 21.60
122    No, maintain solution and obj[gen] = 21.60 , and the tolerance_counter = 9
123    solution chromosome =
124    first level: [ [ 3. 26. 16. 21. 10.]
125    second level: [3. 5. 4. 1. 1.]
126    third level: [2. 3. 2. 2. 6.] ]
127    The No. 10 iteration is finished!
128
129    Beging the No. 11 iteration:
130    obj[gen-1] = 21.60 temp_best_value_gen = 21.60
131    No, maintain solution and obj[gen] = 21.60 , and the tolerance_counter = 10
132    solution chromosome =
133    first level: [ [ 3. 26. 16. 21. 10.]
134    second level: [3. 5. 4. 1. 1.]
135    third level: [2. 3. 2. 2. 6.] ]
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. 26. 16. 21. 10.]
143 second level: [3. 5. 4. 1. 1.]
144 third level: [2. 3. 2. 2. 6.] ]
145 Objective function values and some other indicators:
146 Obj0 = 10.00 Obj1 = 26.00 Obj0 + Obj1 = 36.00
147 Total movement of crane: 12.00
148 Total waiting time in berth position: 14.00
149 Total index of q during berthing: 582.00
150 Specific arrangement for each vessel:
151 V_id: 0 li: 6.0 xi: 3.0 bow of i: 0.0 tail of i: 6.0 gama_i0: 3.0 gama_i1: 5.0
152 duration_time_i: 2.0 demand_i: 80.0 work load_i: 80.0 work load gap_i: 0
153 V_id: 1 li: 8.0 xi: 26.0 bow of i: 22.0 tail of i: 30.0 gama_i0: 5.0 gama_i1: 8
154 .0 duration_time_i: 3.0 demand_i: 140.0 work load_i: 140.0 work load gap_i: 0
155 V_id: 2 li: 4.0 xi: 16.0 bow of i: 14.0 tail of i: 18.0 gama_i0: 4.0 gama_i1:
156 11.0 duration_time_i: 7.0 demand_i: 280.0 work load_i: 280.0 work load gap_i: 0
157 V_id: 3 li: 6.0 xi: 21.0 bow of i: 18.0 tail of i: 24.0 gama_i0: 1.0 gama_i1: 5
158 .0 duration_time_i: 4.0 demand_i: 160.0 work load_i: 160.0 work load gap_i: 0
159 V_id: 4 li: 6.0 xi: 10.0 bow of i: 7.0 tail of i: 13.0 gama_i0: 1.0 gama_i1: 3
160 .0 duration_time_i: 2.0 demand_i: 180.0 work load_i: 180.0 work load gap_i: 0
161
162 Algorithm finished and the total CPU time: 714 s
163 End

```