



```

80     second level: [0. 4. 2. 1. 3. 1. 2. 3. 4. 6.]
81     third level: [2. 2. 2. 4. 6. 6. 6. 3. 2. 2.]
82     The No. 5 iteration is finished!
83
84     Beging the No. 6 iteration:
85     obj[gen-1] = 26.50   temp_best_value_gen = 26.50
86     No, maintain solution and obj[gen] = 26.50 , and the tolerance_counter = 6
87     solution chromosome =
88     first level: [ [ 2.5  7.  11.5 17.5 25.  26.  4.  3.  2.5  2. ]
89     second level: [0. 4. 2. 1. 3. 1. 2. 3. 4. 6.]
90     third level: [2. 2. 2. 4. 6. 6. 6. 3. 2. 2.]
91     The No. 6 iteration is finished!
92
93     Beging the No. 7 iteration:
94     obj[gen-1] = 26.50   temp_best_value_gen = 26.50
95     No, maintain solution and obj[gen] = 26.50 , and the tolerance_counter = 7
96     solution chromosome =
97     first level: [ [ 2.5  7.  11.5 17.5 25.  26.  4.  3.  2.5  2. ]
98     second level: [0. 4. 2. 1. 3. 1. 2. 3. 4. 6.]
99     third level: [2. 2. 2. 4. 6. 6. 6. 3. 2. 2.]
100    The No. 7 iteration is finished!
101
102    Beging the No. 8 iteration:
103    obj[gen-1] = 26.50   temp_best_value_gen = 26.50
104    No, maintain solution and obj[gen] = 26.50 , and the tolerance_counter = 8
105    solution chromosome =
106    first level: [ [ 2.5  7.  11.5 17.5 25.  26.  4.  3.  2.5  2. ]
107    second level: [0. 4. 2. 1. 3. 1. 2. 3. 4. 6.]
108    third level: [2. 2. 2. 4. 6. 6. 6. 3. 2. 2.]
109    The No. 8 iteration is finished!
110
111    Beging the No. 9 iteration:
112    obj[gen-1] = 26.50   temp_best_value_gen = 26.50
113    No, maintain solution and obj[gen] = 26.50 , and the tolerance_counter = 9
114    solution chromosome =
115    first level: [ [ 2.5  7.  11.5 17.5 25.  26.  4.  3.  2.5  2. ]
116    second level: [0. 4. 2. 1. 3. 1. 2. 3. 4. 6.]
117    third level: [2. 2. 2. 4. 6. 6. 6. 3. 2. 2.]
118    The No. 9 iteration is finished!
119
120    Beging the No. 10 iteration:
121    obj[gen-1] = 26.50   temp_best_value_gen = 26.50
122    No, maintain solution and obj[gen] = 26.50 , and the tolerance_counter = 10
123    solution chromosome =
124    first level: [ [ 2.5  7.  11.5 17.5 25.  26.  4.  3.  2.5  2. ]
125    second level: [0. 4. 2. 1. 3. 1. 2. 3. 4. 6.]
126    third level: [2. 2. 2. 4. 6. 6. 6. 3. 2. 2.]
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: [ [ 2.5  7.  11.5 17.5 25.  26.  4.  3.  2.5  2. ]
134 second level: [0. 4. 2. 1. 3. 1. 2. 3. 4. 6.]
135 third level: [2. 2. 2. 4. 6. 6. 6. 3. 2. 2.]
136 Objective function values and some other indicators:
137 Obj0 = 9.00      Obj1 = 94.00      Obj0 + Obj1 = 103.00
138 Total movement of crane: 68.00
139 Total waiting time in berth position: 26.00
140 Total index of q during berthing: 391.00
141 Specific arrangement for each vessel:
142 V_id: 0          li: 5.0          xi: 2.5          bow of i: 0.0          tail of i: 5.0          gama_i0: 0.0          gama_i1: 2.0
143          duration_time_i: 2.0          demand_i: 60.0          work load_i: 60.0          work load gap_i: 0
144 V_id: 1          li: 4.0          xi: 7.0          bow of i: 5.0          tail of i: 9.0          gama_i0: 4.0          gama_i1: 7.0
145          duration_time_i: 3.0          demand_i: 120.0          work load_i: 120.0          work load gap_i: 0
146 V_id: 2          li: 5.0          xi: 11.5          bow of i: 9.0          tail of i: 14.0          gama_i0: 2.0          gama_i1: 5
147          duration_time_i: 3.0          demand_i: 100.0          work load_i: 100.0          work load gap_i: 0
148 V_id: 3          li: 7.0          xi: 17.5          bow of i: 14.0          tail of i: 21.0          gama_i0: 1.0          gama_i1: 3
149          duration_time_i: 2.0          demand_i: 100.0          work load_i: 100.0          work load gap_i: 0
150 V_id: 4          li: 8.0          xi: 25.0          bow of i: 21.0          tail of i: 29.0          gama_i0: 3.0          gama_i1: 4
151          duration_time_i: 1.0          demand_i: 60.0          work load_i: 60.0          work load gap_i: 0
152 V_id: 5          li: 8.0          xi: 26.0          bow of i: 22.0          tail of i: 30.0          gama_i0: 1.0          gama_i1: 3
153          duration_time_i: 2.0          demand_i: 160.0          work load_i: 160.0          work load gap_i: 0
154 V_id: 6          li: 8.0          xi: 4.0          bow of i: 0.0          tail of i: 8.0          gama_i0: 2.0          gama_i1: 3.0
155          duration_time_i: 1.0          demand_i: 80.0          work load_i: 80.0          work load gap_i: 0
156 V_id: 7          li: 6.0          xi: 3.0          bow of i: 0.0          tail of i: 6.0          gama_i0: 3.0          gama_i1: 4.0
157          duration_time_i: 1.0          demand_i: 60.0          work load_i: 60.0          work load gap_i: 0
158 V_id: 8          li: 5.0          xi: 2.5          bow of i: 0.0          tail of i: 5.0          gama_i0: 4.0          gama_i1: 6.0
159          duration_time_i: 2.0          demand_i: 80.0          work load_i: 80.0          work load gap_i: 0
160 V_id: 9          li: 4.0          xi: 2.0          bow of i: 0.0          tail of i: 4.0          gama_i0: 6.0          gama_i1: 10.0
161          duration_time_i: 4.0          demand_i: 160.0          work load_i: 160.0          work load gap_i: 0
162
163 Algorithm finished and the total CPU time: 1193 s

```

unknown

154 End  
155