


```

80     second level: [0. 5.]
81     third level: [2. 5.] ]
82     The No. 5 iteration is finished!
83
84 Beging the No. 6 iteration:
85     obj[gen-1] = 10.50   temp_best_value_gen = 3.00
86     Yes, update solution and obj[gen] = 3.00
87     solution chromosome =
88         first level: [ [2. 8.]
89             second level: [0. 1.]
90             third level: [2. 4.] ]
91     The No. 6 iteration is finished!
92
93 Beging the No. 7 iteration:
94     obj[gen-1] = 3.00   temp_best_value_gen = 3.00
95     No, maintain solution and obj[gen] = 3.00 , and the tolerance_counter = 1
96     solution chromosome =
97         first level: [ [2. 8.]
98             second level: [0. 1.]
99             third level: [2. 4.] ]
100    The No. 7 iteration is finished!
101
102 Beging the No. 8 iteration:
103     obj[gen-1] = 3.00   temp_best_value_gen = 3.00
104     No, maintain solution and obj[gen] = 3.00 , and the tolerance_counter = 2
105     solution chromosome =
106         first level: [ [2. 8.]
107             second level: [0. 1.]
108             third level: [2. 4.] ]
109    The No. 8 iteration is finished!
110
111 Beging the No. 9 iteration:
112     obj[gen-1] = 3.00   temp_best_value_gen = 3.00
113     No, maintain solution and obj[gen] = 3.00 , and the tolerance_counter = 3
114     solution chromosome =
115         first level: [ [2. 8.]
116             second level: [0. 1.]
117             third level: [2. 4.] ]
118    The No. 9 iteration is finished!
119
120 Beging the No. 10 iteration:
121     obj[gen-1] = 3.00   temp_best_value_gen = 3.00
122     No, maintain solution and obj[gen] = 3.00 , and the tolerance_counter = 4
123     solution chromosome =
124         first level: [ [2. 8.]
125             second level: [0. 1.]
126             third level: [2. 4.] ]
127    The No. 10 iteration is finished!
128
129 Beging the No. 11 iteration:
130     obj[gen-1] = 3.00   temp_best_value_gen = 3.00
131     No, maintain solution and obj[gen] = 3.00 , and the tolerance_counter = 5
132     solution chromosome =
133         first level: [ [2. 8.]
134             second level: [0. 1.]
135             third level: [2. 4.] ]
136    The No. 11 iteration is finished!
137
138 Beging the No. 12 iteration:
139     obj[gen-1] = 3.00   temp_best_value_gen = 3.00
140     No, maintain solution and obj[gen] = 3.00 , and the tolerance_counter = 6
141     solution chromosome =
142         first level: [ [2. 8.]
143             second level: [0. 1.]
144             third level: [2. 4.] ]
145    The No. 12 iteration is finished!
146
147 Beging the No. 13 iteration:
148     obj[gen-1] = 3.00   temp_best_value_gen = 3.00
149     No, maintain solution and obj[gen] = 3.00 , and the tolerance_counter = 7
150     solution chromosome =
151         first level: [ [2. 8.]
152             second level: [0. 1.]
153             third level: [2. 4.] ]
154    The No. 13 iteration is finished!
155
156 Beging the No. 14 iteration:
157     obj[gen-1] = 3.00   temp_best_value_gen = 3.00
158     No, maintain solution and obj[gen] = 3.00 , and the tolerance_counter = 8
159     solution chromosome =
160         first level: [ [2. 8.]
161             second level: [0. 1.]
162             third level: [2. 4.] ]
163    The No. 14 iteration is finished!

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164
165
166 -----
167 The iteration is terminated and then visulize the solution:
168   solution chromosome =
169     first level: [ [2. 8.]
170     second level: [0. 1.]
171     third level: [2. 4.] ]
172 Objective function values and some other indicators:
173   Obj0 = 3.00      Obj1 = 1.00      Obj0 + Obj1 = 4.00
174   Total movement of crane: 0.00
175   Total waiting time in berth position: 1.00
176   Total index of q during berthing: 35.00
177 Specific arrangement for each vessel:
178   V_id: 0          li: 4.0          xi: 2.0          bow of i: 0.0          tail of i: 4.0          gama_i0: 0.0          gama_i1: 4.0
179               duration_time_i: 4.0          demand_i: 160.0          work load_i: 160.0          work load gap_i: 0
179   V_id: 1          li: 8.0          xi: 8.0          bow of i: 4.0          tail of i: 12.0          gama_i0: 1.0          gama_i1: 3.0
180               duration_time_i: 2.0          demand_i: 120.0          work load_i: 120.0          work load gap_i: 0
181 Algorithm finished and the total CPU time: 352 s
182 End
183
```