



```

80     second level: [5. 1. 4. 5. 1. 1. 4.]
81     third level: [4. 2. 4. 4. 4. 1. 2.] ]
82     The No. 5 iteration is finished!
83
84     Beging the No. 6 iteration:
85     obj[gen-1] = 20.00 temp_best_value_gen = 20.00
86     No, maintain solution and obj[gen] = 20.00 , and the tolerance_counter = 6
87     solution chromosome =
88     first level: [ [26.5 7. 12.5 17. 22. 27. 3.5]
89     second level: [5. 1. 4. 5. 1. 1. 4.]
90     third level: [4. 2. 4. 4. 4. 1. 2.] ]
91     The No. 6 iteration is finished!
92
93     Beging the No. 7 iteration:
94     obj[gen-1] = 20.00 temp_best_value_gen = 20.00
95     No, maintain solution and obj[gen] = 20.00 , and the tolerance_counter = 7
96     solution chromosome =
97     first level: [ [26.5 7. 12.5 17. 22. 27. 3.5]
98     second level: [5. 1. 4. 5. 1. 1. 4.]
99     third level: [4. 2. 4. 4. 4. 1. 2.] ]
100    The No. 7 iteration is finished!
101
102    Beging the No. 8 iteration:
103    obj[gen-1] = 20.00 temp_best_value_gen = 20.00
104    No, maintain solution and obj[gen] = 20.00 , and the tolerance_counter = 8
105    solution chromosome =
106    first level: [ [26.5 7. 12.5 17. 22. 27. 3.5]
107    second level: [5. 1. 4. 5. 1. 1. 4.]
108    third level: [4. 2. 4. 4. 4. 1. 2.] ]
109    The No. 8 iteration is finished!
110
111    Beging the No. 9 iteration:
112    obj[gen-1] = 20.00 temp_best_value_gen = 20.00
113    No, maintain solution and obj[gen] = 20.00 , and the tolerance_counter = 9
114    solution chromosome =
115    first level: [ [26.5 7. 12.5 17. 22. 27. 3.5]
116    second level: [5. 1. 4. 5. 1. 1. 4.]
117    third level: [4. 2. 4. 4. 4. 1. 2.] ]
118    The No. 9 iteration is finished!
119
120    Beging the No. 10 iteration:
121    obj[gen-1] = 20.00 temp_best_value_gen = 20.00
122    No, maintain solution and obj[gen] = 20.00 , and the tolerance_counter = 10
123    solution chromosome =
124    first level: [ [26.5 7. 12.5 17. 22. 27. 3.5]
125    second level: [5. 1. 4. 5. 1. 1. 4.]
126    third level: [4. 2. 4. 4. 4. 1. 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: [ [26.5 7. 12.5 17. 22. 27. 3.5]
134 second level: [5. 1. 4. 5. 1. 1. 4.]
135 third level: [4. 2. 4. 4. 4. 1. 2.] ]
136 Objective function values and some other indicators:
137 Obj0 = 7.00 Obj1 = 67.00 Obj0 + Obj1 = 74.00
138 Total movement of crane: 46.00
139 Total waiting time in berth position: 21.00
140 Total index of q during berthing: 566.00
141 Specific arrangement for each vessel:
142 V_id: 0 li: 4.0 xi: 26.5 bow of i: 24.5 tail of i: 28.5 gama_i0: 5.0 gama_i1: 7
.0 duration_time_i: 2.0 demand_i: 100.0 work load_i: 100.0 work load gap_i: 0
143 V_id: 1 li: 6.0 xi: 7.0 bow of i: 4.0 tail of i: 10.0 gama_i0: 1.0 gama_i1: 4.0
duration_time_i: 3.0 demand_i: 100.0 work load_i: 100.0 work load gap_i: 0
144 V_id: 2 li: 5.0 xi: 12.5 bow of i: 10.0 tail of i: 15.0 gama_i0: 4.0 gama_i1: 6
.0 duration_time_i: 2.0 demand_i: 140.0 work load_i: 140.0 work load gap_i: 0
145 V_id: 3 li: 4.0 xi: 17.0 bow of i: 15.0 tail of i: 19.0 gama_i0: 5.0 gama_i1: 7
.0 duration_time_i: 2.0 demand_i: 140.0 work load_i: 140.0 work load gap_i: 0
146 V_id: 4 li: 6.0 xi: 22.0 bow of i: 19.0 tail of i: 25.0 gama_i0: 1.0 gama_i1: 3
.0 duration_time_i: 2.0 demand_i: 160.0 work load_i: 160.0 work load gap_i: 0
147 V_id: 5 li: 4.0 xi: 27.0 bow of i: 25.0 tail of i: 29.0 gama_i0: 1.0 gama_i1: 5
.0 duration_time_i: 4.0 demand_i: 80.0 work load_i: 80.0 work load gap_i: 0
148 V_id: 6 li: 7.0 xi: 3.5 bow of i: 0.0 tail of i: 7.0 gama_i0: 4.0 gama_i1: 8.0
duration_time_i: 4.0 demand_i: 140.0 work load_i: 140.0 work load gap_i: 0
149
150 Algorithm finished and the total CPU time: 805 s
151 End
152

```