



```

80     second level: [ 2. 2. 1. 1. 11. 6. 1. 9. 2. 14.]
81     third level: [2. 6. 7. 6. 2. 2. 3. 2. 3. 2.] ]
82     The No. 5 iteration is finished!
83
84     Beging the No. 6 iteration:
85     obj[gen-1] = 40.20 temp_best_value_gen = 40.20
86     No, maintain solution and obj[gen] = 40.20 , and the tolerance_counter = 5
87     solution chromosome =
88     first level: [ [ 1.5 6. 12.5 20. 3.5 2. 4.5 4. 26.5 2. ]
89     second level: [ 2. 2. 1. 1. 11. 6. 1. 9. 2. 14.]
90     third level: [2. 6. 7. 6. 2. 2. 3. 2. 3. 2.] ]
91     The No. 6 iteration is finished!
92
93     Beging the No. 7 iteration:
94     obj[gen-1] = 40.20 temp_best_value_gen = 40.20
95     No, maintain solution and obj[gen] = 40.20 , and the tolerance_counter = 6
96     solution chromosome =
97     first level: [ [ 1.5 6. 12.5 20. 3.5 2. 4.5 4. 26.5 2. ]
98     second level: [ 2. 2. 1. 1. 11. 6. 1. 9. 2. 14.]
99     third level: [2. 6. 7. 6. 2. 2. 3. 2. 3. 2.] ]
100    The No. 7 iteration is finished!
101
102    Beging the No. 8 iteration:
103    obj[gen-1] = 40.20 temp_best_value_gen = 40.20
104    No, maintain solution and obj[gen] = 40.20 , and the tolerance_counter = 7
105    solution chromosome =
106    first level: [ [ 1.5 6. 12.5 20. 3.5 2. 4.5 4. 26.5 2. ]
107    second level: [ 2. 2. 1. 1. 11. 6. 1. 9. 2. 14.]
108    third level: [2. 6. 7. 6. 2. 2. 3. 2. 3. 2.] ]
109    The No. 8 iteration is finished!
110
111    Beging the No. 9 iteration:
112    obj[gen-1] = 40.20 temp_best_value_gen = 40.20
113    No, maintain solution and obj[gen] = 40.20 , and the tolerance_counter = 8
114    solution chromosome =
115    first level: [ [ 1.5 6. 12.5 20. 3.5 2. 4.5 4. 26.5 2. ]
116    second level: [ 2. 2. 1. 1. 11. 6. 1. 9. 2. 14.]
117    third level: [2. 6. 7. 6. 2. 2. 3. 2. 3. 2.] ]
118    The No. 9 iteration is finished!
119
120    Beging the No. 10 iteration:
121    obj[gen-1] = 40.20 temp_best_value_gen = 40.20
122    No, maintain solution and obj[gen] = 40.20 , and the tolerance_counter = 9
123    solution chromosome =
124    first level: [ [ 1.5 6. 12.5 20. 3.5 2. 4.5 4. 26.5 2. ]
125    second level: [ 2. 2. 1. 1. 11. 6. 1. 9. 2. 14.]
126    third level: [2. 6. 7. 6. 2. 2. 3. 2. 3. 2.] ]
127    The No. 10 iteration is finished!
128
129    Beging the No. 11 iteration:
130    obj[gen-1] = 40.20 temp_best_value_gen = 40.20
131    No, maintain solution and obj[gen] = 40.20 , and the tolerance_counter = 10
132    solution chromosome =
133    first level: [ [ 1.5 6. 12.5 20. 3.5 2. 4.5 4. 26.5 2. ]
134    second level: [ 2. 2. 1. 1. 11. 6. 1. 9. 2. 14.]
135    third level: [2. 6. 7. 6. 2. 2. 3. 2. 3. 2.] ]
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: [ [ 1.5 6. 12.5 20. 3.5 2. 4.5 4. 26.5 2. ]
143    second level: [ 2. 2. 1. 1. 11. 6. 1. 9. 2. 14.]
144    third level: [2. 6. 7. 6. 2. 2. 3. 2. 3. 2.] ]
145    Objective function values and some other indicators:
146    Obj0 = 17.00 Obj1 = 79.00 Obj0 + Obj1 = 96.00
147    Total movement of crane: 30.00
148    Total waiting time in berth position: 49.00
149    Total index of q during berthing: 337.00
150    Specific arrangement for each vessel:
151    V_id: 0 li: 3.0 xi: 1.5 bow of i: 0.0 tail of i: 3.0 gama_i0: 2.0 gama_i1: 6.0
152    duration_time_i: 4.0 demand_i: 160.0 work load_i: 160.0 work load gap_i: 0
153    V_id: 1 li: 6.0 xi: 6.0 bow of i: 3.0 tail of i: 9.0 gama_i0: 2.0 gama_i1: 4.0
154    duration_time_i: 2.0 demand_i: 160.0 work load_i: 160.0 work load gap_i: 0
155    V_id: 2 li: 7.0 xi: 12.5 bow of i: 9.0 tail of i: 16.0 gama_i0: 1.0 gama_i1: 2
156    duration_time_i: 1.0 demand_i: 140.0 work load_i: 140.0 work load gap_i: 0
157    V_id: 3 li: 8.0 xi: 20.0 bow of i: 16.0 tail of i: 24.0 gama_i0: 1.0 gama_i1: 2
158    duration_time_i: 1.0 demand_i: 80.0 work load_i: 80.0 work load gap_i: 0
159    V_id: 4 li: 7.0 xi: 3.5 bow of i: 0.0 tail of i: 7.0 gama_i0: 11.0 gama_i1: 14.0
160    duration_time_i: 3.0 demand_i: 100.0 work load_i: 100.0 work load gap_i: 0
161    V_id: 5 li: 4.0 xi: 2.0 bow of i: 0.0 tail of i: 4.0 gama_i0: 6.0 gama_i1: 9.0
162    duration_time_i: 3.0 demand_i: 120.0 work load_i: 120.0 work load gap_i: 0
163    V_id: 6 li: 9.0 xi: 4.5 bow of i: 0.0 tail of i: 9.0 gama_i0: 1.0 gama_i1: 2.0

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157		duration_time_i: 1.0	demand_i: 60.0	work load_i: 60.0	work load gap_i: 0	
158	V_id: 7	li: 8.0	xi: 4.0	bow of i: 0.0	tail of i: 8.0	gama_i0: 9.0
		duration_time_i: 2.0	demand_i: 60.0	work load_i: 60.0	work load gap_i: 0	gama_i1: 11.0
159	V_id: 8	li: 3.0	xi: 26.5	bow of i: 25.0	tail of i: 28.0	gama_i0: 2.0
	.0	duration_time_i: 2.0	demand_i: 120.0	work load_i: 120.0	work load gap_i: 0	gama_i1: 4
160	V_id: 9	li: 4.0	xi: 2.0	bow of i: 0.0	tail of i: 4.0	gama_i0: 14.0
		duration_time_i: 4.0	demand_i: 160.0	work load_i: 160.0	work load gap_i: 0	gama_i1: 18.0
161						
162	Algorithm finished and the total CPU time: 1249 s					
163	End					
164						