**MsMlAJSP test data**

1. **Products information（Np=5）**

Table 1 Products Information

|  |  |  |
| --- | --- | --- |
| Product Index (*z*) | Component jobs | Assembly operations |
| 1 | [1,2,3] | [1,2,3,5] |
| 2 | [1,3,4] | [1,2,3,4] |
| 3 | [2,3,4] | [1,2,3,5,7] |
| 4 | [1,3] | [1,2,3,6] |
| 5 | [2,3] | [1,2,3,6,8] |

1. **jobs information（NQ=5）**

Table 2 jobs Information

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Job index(*j*) | Release time | Processing operations | Number of operations | Weight |
| 1 | 15 | [1,2] | 2 | 317 |
| 2 | 10 | [3,4,5] | 3 | 580 |
| 3 | 20 | [6] | 1 | 497 |
| 4 | 15 | [7,8] | 2 | 276 |
| 5 | 25 | [9] | 1 | 571 |

1. **Processing operations information（NQ=5）**

Table 3 Processing operations information

|  |  |
| --- | --- |
| Processing operation index(*o*) | Processing time on different machine |
| 1 | [45, 31, 42, Inf, Inf, 67] |
| 2 | [50, Inf, 25, 36, 45, 57] |
| 3 | [21, 55, Inf, 26, Inf, 34] |
| 4 | [48, Inf, 35, 30, Inf, 47] |
| 5 | [Inf, 45, 52, 25, 33, 26] |
| 6 | [45, Inf, Inf, 38, 45, 28] |
| 7 | [31, Inf, 35, 45, Inf, 32] |
| 8 | [Inf, 35, 51, 32, 53, 64] |
| 9 | [44, 31, 40, 38, Inf, 35] |
| 10 | [Inf, 35, 55, 24, 37, 64] |
| 11 | [43, Inf, 35, 66, 35, 54] |
| Note: Inf is that the process cannot be processed on this machine. | |

1. **Setup time information**

Table 4 Setup time information

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| latter job’s number  Previous job’s number | 1 | 2 | 3 | 4 | 5 |
| 1 | 0 | 10 | 14 | 13 | 13 |
| 2 | 10 | 0 | 13 | 11 | 12 |
| 3 | 15 | 16 | 0 | 14 | 13 |
| 4 | 7 | 14 | 18 | 0 | 13 |
| 5 | 15 | 16 | 15 | 17 | 0 |

1. **Transportation vehicle information**

The maximum transportation load of the vehicle *Gmax* = 2000kg, transport distance *DisP-A* = 4000m vehicle speed *V0* = 20m/s when unloaded, and speed *V* = (1-0.0015)\* *V0* when loaded.

1. **Assembly operation information**

Table 5 Assembly operation information

|  |  |  |
| --- | --- | --- |
| Assembly operation index(*a*) | Immediately preceding operation | Operation time |
| 1 | [] | 48 |
| 2 | [] | 35 |
| 3 | [1,2] | 42 |
| 4 | [3] | 45 |
| 5 | [3] | 32 |
| 6 | [3] | 58 |
| 7 | [5] | 40 |
| 8 | [6] | 33 |
| Note: [] means that there is no fast forward operation for this assembly operation. | | |

1. **Energy consumption data**

Table 6 Energy consumption data

|  |  |  |  |
| --- | --- | --- | --- |
| Type of energy consumption  Stage | Working energy consumption | Idle energy consumption | Setup energy consumption |
| Processing stage | {6,7,8,9,10} | {1,2,3} | {2,3,4,5} |
| Transportation stage | 50 | [] | [] |
| Assembly stage | 8 | 2 | [] |