1. Bad Marking Detection Algorithm_1

Algorithm A1: Bad Marking Detection Algorithm_1 (BMDA_1)

Input: An S^{4}PR and a set of partial deadlocks M_D
Output: A set of illegal markings M_I

1 Let M_I=M_D;
2 **For** each $M \in M_I$, **do**
3 **For** each backward-enabled transition t at M, **do**
4 t backward fires at M, where $M\langle t]M'$;
5 **If** any enabled transition t' at M' satisfies $M'[t'\rangle M_i$ and $\exists M_j \in M_I$: $\forall p \in P_{M_j}$, $M_j(p)=M_i(p)$, **then**
6 $M_I=M_I \cup \{M'\}$;
7 **End**
8 **End**
9 **End**
10 **Return** M_I;
11 **End**

2. Bad Marking Detection Algorithm_2

Algorithm A2: Bad Marking Detection Algorithm_1 (BMDA_2)

Input: An S^{4}PR and a set of partial deadlocks M_D
Output: A set of ATI-partial deadlocks and bad markings M_B

1 Let $M_B=\varnothing$;
2 Obtaining ATI-partial deadlocks for each partial deadlock, where M_A is a set of ATI-partial deadlocks;
3 **For** each $M \in M_A$, **do**
4 **For** each backward-enabled transition t, **do**
5 t backward fires at M, where $M\langle t]M'$;
6 **For** each enabled transition t' at M', **do**
7 **If** $M(p_x)$ is a constant and $\forall M_j \in M_A$ is not an equivalent marking of M_i, where $p_x \in {}^\bullet t' \cap P_A$ and $M'[t'\rangle M_i$, **then**
8 Jump to Line 4;
9 **Else if** $M(p_x)$ is a variable and $\forall M_j \in M_A$ is not an equivalent marking of M_i, where $p_x \in {}^\bullet t' \cap P_A$ and $M'[t'\rangle M_i$, **then**
10 $M'(p_x)=0$;
11 **End**
12 **End**
13 $M_B=M_B \cup \{M'\}$ and $M_A=M_A \cup \{M'\}$;
14 **End**
15 **End**
16 **Return** M_B;
17 **End**