The solution for this
\[ \text{LCTABLE}(N) \] requires \( N \) more logical operations than
and we easily see that
\[ P_N = 2 ( P_{N-1} + N) \]
and \( P_1 = 2 \).

The solution for this \( P_N \) is
\[ P_N = 4 \cdot 2^N - 2N - 4. \]

REFERENCES


APPENDIX B

PROOF FOR (23)

Let \( P_N \) be the number of logical operations needed for constructing all \( l \)-conv tables for an \( N \)-bit image. We denote such a \( l \)-conv table as \( \text{LCTABLE}(N) \). \( P_N \) can be calculated on the basis of \( P_{N-1} \) corresponding to \( \text{LCTABLE}(N-1) \). The first row in the \( \text{LCTABLE}(N) \) requires \( N \) more logical operations than \( P_{N-1} \) just for a given first bit of the \( N \)-bit threshold value. There are two cases (either “0” or “1”) for such. So we have
\[ P_N = 2 ( P_{N-1} + N) \]
and we easily see that
\[ P_1 = 2. \]

The reduction method is given for better conservation of Petri net property.

CORRECTIONS TO GENERALIZED PETRI NET REDUCTION METHOD

HYUNG LEE-KWANG AND JOEL FAVREL

Abstract—A reduction method of Petri nets has been proposed by Lee-Kwang and Favrel. In this correspondence, a modification of the

Reduction Method

Among the six generalized reducible subnets (GRSN), GRSN-1T, 2T and 3T are type of SNT (subnet of transition). In GRSN-1T and 3T, transitions \( t \) and \( t \) are defined, but not in GRSN-2T.

From the previous example, we find that the liveness is not conserved because the transition \( t \) has more than one input place (in this case, \( t \) has two input places, \( p_1 \) and \( p_2 \)). Then the transition \( t_1 \) cannot have more than one input place in GRSN-1T and 3T. The modifications are given to the ID and OD in GRSN-1T and 3T as follows.

In GRSN-1T, the condition a)
\[ ID \cup OD = \{ t_1, t_2 \}; \quad BD = \{ p_1 \}, \quad M(p_1) = 0; \]
In GRSN-3T, the condition a)
\[
\begin{align*}
\{ t_1, t_2, \ldots, t_m \} & \subseteq ID, \quad m = 1,2, \ldots \\
\{ t_m, t_{m+1}, \ldots, t_{m+n} \} & \subseteq OD, \quad n = 1,2, \ldots \\
BD & = \{ p_1, p_2, \ldots, p_q \}, \quad q = 1,2, \ldots \\
M(p_i) & = 0,
\end{align*}
\]
is changed such as
\[
\begin{align*}
\{ t_1, t_2, \ldots, t_m \} & \subseteq ID, \quad m = 1,2, \ldots \\
\{ t_m, t_{m+1}, \ldots, t_{m+n} \} & \subseteq OD, \quad n = 1,2, \ldots \\
BD & = \{ p_1, p_2, \ldots, p_q \}, \quad q = 1,2, \ldots \\
M(p_i) & = 0;
\end{align*}
\]
The other conditions are same.

III. Conclusion
We have shown an example in which the reduction rules GRSN-1T and 3T do not conserve the property of liveness of Petri nets. The two reduction rules have been modified. The modified reduction method is useful for both ordinary and generalized nets.

REFERENCES