draw the reachability graph for the net (N', M_0'). It is also easy to verify that the two reachability graphs are isomorphic, and that the two nets (N, M_0) and (N', M_0') are equivalent with respect to the behavior of all possible (total-ordered) firing sequences.

The above discussions may be summarized in the following theorem.

Theorem 1.1. Let (N, M_0) be a finite capacity net, where the strict transition rule is to be applied. Let (N', M_0') be the net obtained from (N, M_0) by the complementary-place transformation, where the weak transition rule is applicable to (N', M_0'). Then the two nets (N, M_0) and (N', M_0') are equivalent in the sense that both have the same set of all possible (total-ordered) firing sequences.

In view of Theorem 1.1, every finite capacity net (N, M_0) can be transformed into an equivalent net (N', M_0'), where the weak transition rule is applicable, and thus, we only need consider the weak transition rule. Therefore, unless otherwise stated, we consider only infinite capacity nets with the weak transition rule in the rest of chapters in this book. The reason is that all properties associated with a finite capacity net can be discussed in terms of those with an infinite capacity net using the complementary-place transformation.

For the analysis using incidence matrices discussed in Chapter 4, a self-loop must be transformed into a loop by introducing a dummy pair of a transition and a place, as is illustrated in Fig. 1.3. However, one must be very careful because Petri nets before and after the transformation may have different meanings in some applications (e.g., different total capacities - see Problem 1.5).