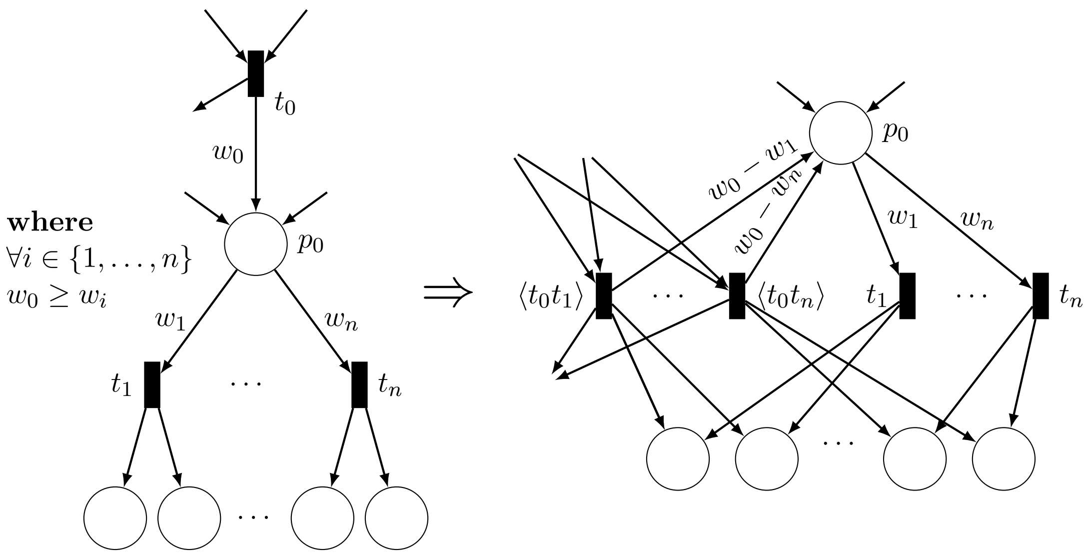
Rule R: Atomic post-agglomerable producer

Rule R is similar to a post agglomeration rule and a formal description of Rule R is in Figure 1. In Rule R we look for a place p_0 with a producer t_0 such that t_0 can always be followed by a firing of any consumer of p_0 without inhibiting other transitions or affecting places in $places(\varphi)$. The producer t_0 is then replaced with new transitions, one for each consumer, and these new transitions combine the effect of firing t_0 and the given consumer. Similarly to an agglomeration rule, Rule R removes interleavings despite potentially increasing the size of the Petri net. However, Rule R is more general, since it only operates on one producer at a time and leaves p_0 untouched, allowing tokens in p_0 in the initial marking, which a post agglomeration does not. Additionally, Rule R does not require the weights of the arcs to and from the agglomerated place to be equal, making R usable in many cases.

Theorem 1 *Rule R in Figure 1 is correct for LTL$\setminus$X.*



Precondition	Update
Fix place p_0 and transition t_0 s.t.: R1) $t_0 \in {}^\bullet p_0 \wedge p_0^\bullet \neq \emptyset$ R2) ${}^\bullet p_0 \cap p_0^\bullet = \emptyset$ R3) $p_0^\circ = {}^\circ(p_0^\bullet) = ((p_0^\bullet)^\bullet)^\circ = \emptyset$ R4) $(\{p_0\} \cup (p_0^\bullet)^\bullet) \cap places(\varphi) = \emptyset$ R5) ${}^\bullet(p_0^\bullet) = \{p_0\}$ R6) $\boxplus(t_0, p_0) \geq \boxminus(p_0, t)$ for all $t \in p_0^\bullet$	UR1) For each transition $t \in p_0^\bullet$ create a transition $\langle t_0 t \rangle$ with the following arcs: $\boxminus(\langle t_0 t \rangle) = \boxminus(t_0)$ $\boxplus(\langle t_0 t \rangle) = \boxplus(t_0) + \boxplus(t) - \boxminus(t)$ $I(\langle t_0 t \rangle) = I(t_0)$ UR2) Remove t_0

Figure 1: Rule R: Atomic post-agglomerable producer