Given a specification $P$ and a prestate $\sigma$ with $t$ as time variable, we might define “the exact precondition for termination” as follows:

$$\exists n \cdot \forall \sigma' \cdot t' \leq t+n \iff P$$

Letting $x$ be an integer variable, find the exact precondition for termination of the following, and comment on whether it is reasonable.

(a) $$x \geq 0 \Rightarrow t' \leq t+x$$

§ Letting $x$ be an integer variable, find the exact precondition for termination of the following, and comment on whether it is reasonable.

(b) $$\exists n : \text{nat} \cdot t' \leq t+n$$

§ Letting $x$ be an integer variable, find the exact precondition for termination of the following, and comment on whether it is reasonable.

(c) $$\exists f : \text{int} \rightarrow \text{nat} \cdot t' \leq t + fx$$

§ This is just like part (b).

The paper *Halting According to aPTop* is based on the formula for the exact precondition for termination.