
Algorithm 1 Safe Verification Algorithm

Require: $\mathcal{N}, \mathcal{S}, v_c, t_c$ ▷ The schedule is given
 $N \leftarrow \text{size of } \mathcal{S}$
 $(\mathcal{G}, C, \mathcal{R}, \underline{x}, \bar{x}, w) \leftarrow \mathcal{N}$
 $T_{vec} \leftarrow \emptyset$ ▷ Collect all possibly changing time instances
 $indicator = ones(length(\mathcal{V}) - 1, 1)$
 for $v \in \mathcal{V} \setminus v_c$ **do**
 for $j = 1 : N$ **do**
 for $e \in R_j$ **do**
 $T = [T; L_e^j; U_e^j]$ ▷ L_e^j, U_e^j defined in (13),(14)
 end for
 end for
 $T = unique(sort(T, 'ascend'))$
 for $k_1 = 1 : length(T)$ **do**
 Check (15)
 if (15) not hold **then**
 $indicator(v) = 0$
 end if
 end for
 if $indicator(v) = 1$ for all $v \in \mathcal{V}$ **then**
 return \mathcal{S} is time-node conditionally safe for v_c at t_c
 end if
 end for
