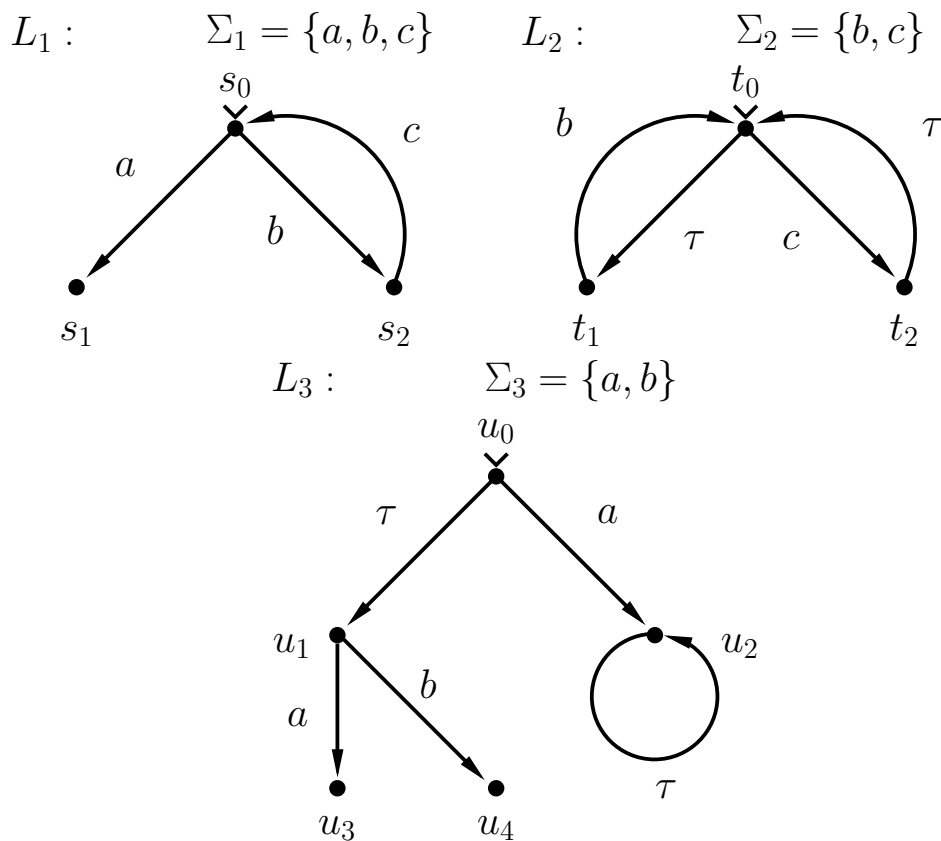


1. Consider the following three LTSs L_1 , L_2 , and L_3 :



- Compute the parallel composition $L = L_1 \parallel L_3$.
- Does $L = L_1 \parallel L_3$ contain any conflicts? If it does, please give a list consisting of triples (v, t, t') , where: v is a global states of L where a conflict occurs and t, t' are a pair of global transitions of $L_1 \parallel L_3$ which are in conflict in v .
- Does $L = L_1 \parallel L_3$ contain any deadlocks? If it does, please give a list of global states of L which are deadlocks.
- Does $L = L_1 \parallel L_3$ contain any livelocks? If it does, please give a lists global state of L in which a livelock exists.

- e) Does $L = L_1 \parallel L_3$ contain a pair of independent transitions? If it does, give two global transitions which are independent.
- f) Give $traces(L_3)$ as a list of sequences over Σ_3 .
- g) Give $traces(L_1)$ as a regular expression.
- h) Give a deterministic finite automaton accepting $\Sigma_1^* \setminus traces(L_2)$.
- i) Check whether $traces(L_1) \subseteq traces(L_2)$ using the automaton constructed in the previous step. If not, give a word in $traces(L_1) \setminus traces(L_2)$.