A Supplementary Material: Complex Temporal Constraints Description

A.1 Example of Simple Temporal Constraints

In the following figure we present examples for each possible simple temporal constraints.

Fig. 5. Simple Temporal Constraints Illustration

A.2 Example of Complex Constraints

In the following figure we present examples for each possible complex temporal constraints.

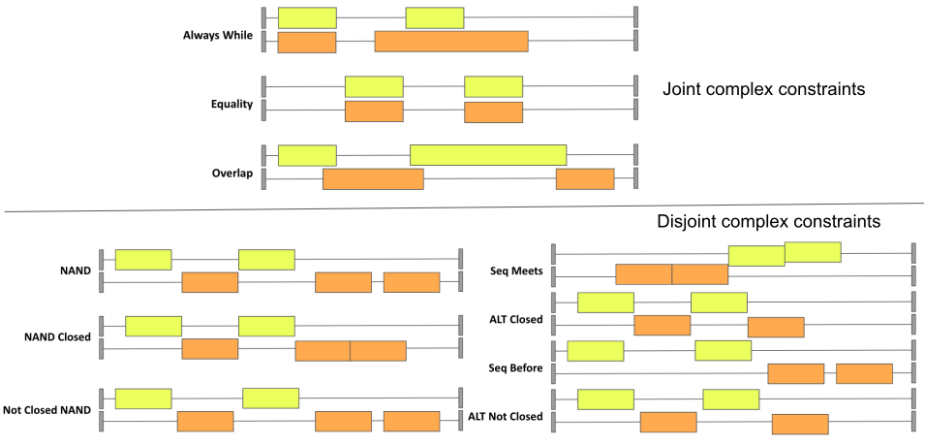

Fig. 6. Complex Temporal Constraints Illustration

A.3 Joint Complex Temporal Constraints

In this section we define the final Joint Complex Temporal Constraints.

- **Always While.** All quadruplets of a time sequence share an intersection with another quadruplet of the other time sequence that is equal to its temporal interval (i.e. $q.I \cap_T q'.I = q.I$). More formally,the Always While constraint is fulfilled if:

$$M_{\triangleright}[equals][r(S,S')] + M_{\triangleright}[during][r(S,S')] +$$
$$M_{\triangleright}[starts][r(S,S')] + M_{\triangleright}[finishes][r(S,S')] = |S|$$

A.4 Disjoint Complex Temporal Constraints

In this section we define the final 5 Disjoint Complex Temporal Constraints.

- **NAND** For every relevant inter-comparison (I, I') there is no intersected relation that is fulfilled. More formally, the NAND constraint is fulfilled if:

$$\left(\sum_{a \in JR} M_{\triangleright}[a][r(S,S')] \right) = 0$$

- **Closed_NAND** No gap appears between the first and last quadruplets regardless of the time sequence. More formally, the Closed_NAND constraint is fulfilled if:

$$M_{\triangleright}[meets][r(S,S')] + M_{\triangleright}[meets][r(S',S)] +$$
$$M_{\triangleleft}[meets][S] + M_{\triangleleft}[meets][S'] = |S| + |S'| - 1$$

- **Not_closed_NAND** A gap always appear between any intervals (inter or intra-time sequence). More formally, the Not_closed_NAND constraint is fullfiled if:

$$M_{\triangleleft}[meets][S] + M_{\triangleleft}[meets][S'] = 0 \wedge$$
$$\left(\left(\sum_{a \in DR/\{before\}} M_{\triangleright}[a][r(S,S')] + M_{\triangleright}[a][r(S',S)] \right) = 0 \right)$$

- **ALT_not_closed** After the apparition of a quadruplet of a time sequence a quadruplet of the other time sequence will happen after a gap (or nothing if at the end of time sequence). More formally, the ALT_not_closed constraint is fullfiled if:

$$M_{\triangleright}[before][r(S,S')] +$$
$$M_{\triangleright}[before][r(S',S)] = |S| + |S'| - 1$$

- **Sequence_Before** The last quadruplet of S happens before every other quadruplets of S'. More formally, the Sequence_Before constraint is fullfiled if:

$$M_{\triangleright}[before][r(S,S')] = 1 \wedge$$
$$(\sum_{a \in DR} M_{\triangleright}[a][r(S,S')] + M_{\triangleright}[a][r(S',S)]) = 1$$