# 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.

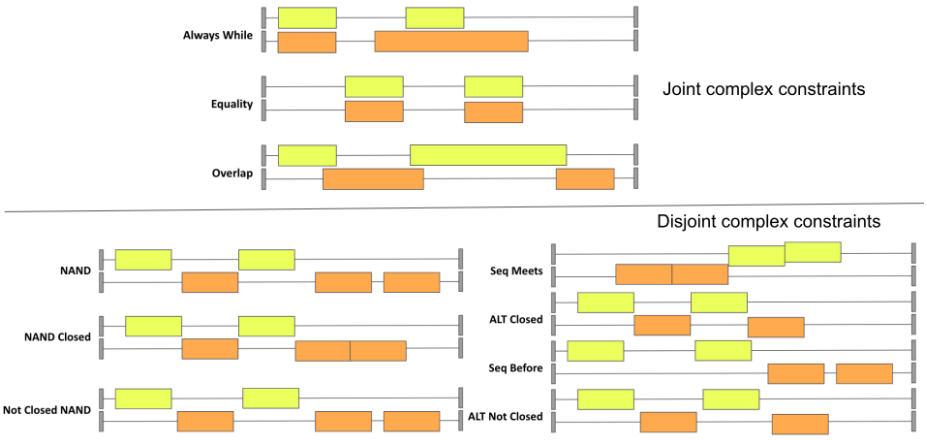


**Fig. 6.** Complex Temporal Constraints Illustration

### 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 jointed 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:

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