

A SOUND AND COMPLETE AXIOMATIZATION FOR THE LINEAR LOGIC OF KNOWLEDGE AND TIME LTK

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The multi-modal propositional logic LTK combines linear time and knowledge and is semantically defined as the set of all the formulae valid on LTK -frames, the prefix LTK standing for *Linear Time and Knowledge*. LTK -frames are multi-modal Kripke-frames that combine a linear and discrete representation of the flow of time with special $S5$ -like modalities, defined at each time cluster and representing agents' knowledge.

The logic LTK has already been proved to be decidable with respect both to its theorems and to its admissible inference rules (see [2, 1]).

Our research aims at finding a sound and complete axiomatization of LTK. We have developed an axiomatic system \mathcal{AS}_{LTK} in which the axioms describing the flow of time give rise to an $S4.3$ modal system, whereas the ones intended to describe agents' knowledge produce a series of $S5$ modal systems. Moreover, several axioms have been added to the system in order to regiment the interactions between distinct modalities. This is the most important part of our approach because there are several problems behind the interactions of different modalities. However, we proved the following result:

THEOREM 1. $LTK = LTK_{ax}$.

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