

Logic of Questions

Michal Peliš

PhD Thesis

Abstract

The thesis deals with logic of questions (erotetic logic), which is one of the branches of non-classical logic. In the introductory part we speak generally about formalization of questions and the newest approaches to questions in logic are summed up. We introduce a formalization based on sets of direct answers and point out the role of inferences with questions. The rest of the thesis consists of two parts that can be read independently.

The first part focuses on relationships among consequence relations in inferential erotetic logic (IEL). We keep the framework of original IEL, introduced by Andrzej Wiśniewski, together with the representation of questions by sets of direct answers. Answers are strictly formulas of the declarative language. The mix of interrogatives and declaratives occurs just on the level of consequences. Consequence relations with questions are defined by means of multiple-conclusion entailment among sets of declarative formulas. This way, one can work with classes of models and to make transparent some properties and relationships. We provide a general study of erotetic inferences based on IEL that is open for non-classical applications.

The second part contains epistemic erotetic logic. A question is understood as a set of direct answers; however, this time the set is finite. The satisfiability of a question in a state (possible world) of an epistemic model is defined by three conditions (a questioner does not know any direct answer, each direct answer considers as possible and at least one of them must be the right one). This approach is a new one and it is suitable for generalization to every epistemic-like system by questions and common erotetic concepts (e.g., various types of answers and erotetic inferences). The goal of this study is a future application in communication theory of a group of agents. We finish this part by multi-agent public announcement logic with application of questions by answer mining in a group of agents.