

Term Paper

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Spring, 2018

As you have seen during the semester, there are lots kinds of non-classical logics. Indeed, we've only looked at the most common. We've seen classical logic (the most classical of the non-classical logics), intuitionistic logic, modal logics (subdivided into normal ones like K and T , regular ones like C and CT , and quasi-regular ones like $S2$ and $S3$), many valued logics, first degree entailment, relevance logics, and fuzzy logic. All these have their proof methods; we've discussed tableaux, but axiom systems and natural deduction are also common. All these logics have a semantics, sometimes with possible worlds, sometimes not. And all of them have what we might call their *stories*.

Ever since the 1960's, modal logic has been associated with possible worlds. The introduction of possible world semantics revolutionized the subject. What is more, it has become almost universal to use possible world language when speaking about modal concepts. We believe this helps us understand what we are talking about. But, do we mean possible worlds to be, in some sense, real things? Or are they just players in a story we tell to account intuitively for how modal logics behave? Of course possible worlds provide us with mathematically precise machinery for proving things about the behavior of modal logics. That is wonderful. But just what is their real explanatory power? Carrying this further, modal possible worlds are not intended to be the same as those behind intuitionistic logic semantics, and both are different from those used with relevance logics. Same problems for all these logics, but perhaps not the same answers.

Many valued logics don't use possible worlds at all. They use, well, many values. Do the multiple truth values of a many valued semantics represent some aspect of reality? For Frege the true and the false seem to be as real as numbers themselves. Are multiple truth values simply pieces of mathematical machinery, or are they too just part of a story intended to give us intuition about a formally defined logic, defined using axioms and rules? Or could it be that there more to it in some non-obvious way?

We have seen something of the semantic machinery developed for relevance logics. But there is also the motivating condition that in relevance logic conditionals, antecedents should somehow have something to do with consequents. There are formal results, but here it is perhaps less clear what story is being told. And fuzzy logics too have their peculiar problems.

You are to pick at least three of the logics we discussed, from different families. For each, describe the "story" that the semantics or the proof theory is supposed to be capturing. Evaluate how well it captures it? And what "capturing it" might mean. Discuss whether these stories we tell ourselves motivate, explain, or just replace one vague notion with another. That is, critically evaluate not just the formalisms, but our informal ways of thinking about the formalisms.