Fragments of Logic, Language, and Computation

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Abstract

Amsterdam-style logicians view modal logic as a fragment of classical logic, and description logicians view their own formalisms in much the same way. Moreover, first-order logic itself can be viewed as a modest fragment of the higher-order logics of Frege and Russell, a fragment with useful model-theoretic properties. All in all, the fine structure of logic is a key topic in contemporary research, as the intensive study of (say) the 2-variable and various guarded fragments attest.

In this talk I want to consider the role of logical fragments in applications. I will focus on applications in natural language, as this is an area rich in non-monotonic and defeasible inference. Moreover, as my perspective is that of computational (rather than theoretical) linguistics, I am interested in efficient solutions to computational tasks - that is, in fragments of computation. Drawing on a running example involving applications of description logic and classical planning to a dialogue system, I will discuss the role of computation to provide "pragmatic glue" that lets us work with small well-explored logical fragments, while simultaneously providing the dynamics required to model various forms of non-monotonicity.