DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
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COMPUTER SCIENCE COLLOQUIUM

Hybrid Logic

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Abstract:

Hybrid logics are a principled generalization of both modal logics and description logics, a standard formalism for knowledge representation. Hybrid logics allow direct reference to worlds/times/states or whatever the elements of the model (a graph) are meant to represent.

It is easy to justify interest in hybrid logic on applied grounds, because of the usefulness of the additional expressive power. For example, when reasoning about time one often wants to build up a series of assertions about what happens at a particular instant, and standard modal formalisms do not allow this. What is less obvious is that the route hybrid logic takes to overcome this problem often actually improves the behavior of the proof procedures. For example, it is far simpler to formulate natural deduction systems in hybrid logic than in ordinary modal logic.

In my talk I describe essential proof-theoretical results for a natural deduction formulation of hybrid logic. The natural deduction system is extended with additional inference rules corresponding to conditions on the model expressed by so-called geometric theories. Thus, I give natural deduction systems in a uniform way for a wide class of hybrid logics. This shows that hybrid logics are a viable enterprise and opens up the way for future applications.

Host: Kim Skak Larsen