Conditional logics: a proof-theoretic perspective

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Conditional logics, introduced by David Lewis in 1973, extend classical propositional logic with a binary modal operator which captures fine-grained notions of conditionality, such as counterfactual reasoning or non-monotonic inferences. Analytic proof systems for these logics adapt the methods developed for modal logic, and are defined either by extending the language of sequent calculus through labels or by adding structural connectives, as in nested or hypersequent calculi.

In this talk, I will present sequent calculi for conditional logics that exemplify both approaches: a labelled sequent calculus that modularly captures a wide range of systems, and a nested-style calculus that employs a structural connective corresponding to neighborhoods in the semantic models. These calculi are grounded in neighborhood semantics, which provide a flexible framework for representing conditionals. I will conclude by discussing recent developments on intuitionistic conditional logics, defined by adding the conditional operator to intuitionistic propositional logic, and outline corresponding proof-theoretic systems.

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