

- REVANTHA RAMANAYAKE, *Sequent calculi with restricted cuts for non-classical logics*.

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The primary motivation for cut-elimination is that it leads to a proof calculus with the subformula property. Such a proof calculus has a restricted proof search space and this is a powerful aid for investigating the properties of the logic. Unfortunately, many substructural and modal logics of interest lack a sequent calculus that supports cut-elimination. The overwhelming response since the 1960s has been to generalise the sequent calculus in a bid to regain cut-elimination. The price is that these generalised formalisms are more complicated to reason about and implement.

There is an alternative: remain with the sequent calculus by accepting weaker (but still meaningful) versions of the subformula property. We will discuss how cut-free hypersequent proofs can be transformed into sequent calculus proofs in a controlled way [1]. Combined with the quite general methodology [2] for transforming Hilbert axiomatic extensions into cut-free hypersequent calculi, this leads to an algorithm taking a Hilbert axiomatic extension to a sequent calculus with a weak subformula property.

Can we avoid this detour through the hypersequent calculus? This goes to the heart of a new programme called *cut-restriction* that aims to adapt Gentzen's celebrated cut-elimination argument systematically so that cut-formulas are restricted (when elimination is not possible). We will present the early results in this programme: from arbitrary cuts to analytic cuts in the sequent calculi for bi-intuitionistic logic and $S5$ via a uniform cut-restriction argument (the results themselves are well-known).

Based on joint work with Agata Ciabattoni (TU Wien) and Timo Lang (UCL).

[1] AGATA CIABATTONI AND TIMO LANG AND REVANTHA RAMANAYAKE, *Bounded-analytic Sequent Calculi and Embeddings for Hypersequent Logics*, **Journal of Symbolic Logic**, vol. 86 (2021), no. 2, pp. 635–668.

[2] A. CIABATTONI AND N. GALATOS AND K. TERUI, *From axioms to analytic rules in nonclassical logics*, **Proceedings of the Twenty-Third Annual IEEE Symposium on Logic in Computer Science (LICS)** Pittsburgh, PA, USA, IEEE Computer Society, 2008, pp. 229–240.