

Contraction-Free Linear Depth Sequent Calculi for Intuitionistic Propositional Logic with the Subformula Property and Minimal Depth Counter-Models

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Abstract In this paper we present **LSJ**, a contraction-free sequent calculus for Intuitionistic propositional logic whose proofs are linearly bounded in the length of the formula to be proved and satisfy the subformula property. We also introduce a sequent calculus **RJ** for intuitionistic unprovability with the same properties of **LSJ**. We show that from a refutation of **RJ** of a sequent σ we can extract a Kripke counter-model for σ . Finally, we provide a procedure that given a sequent σ returns either a proof of σ in **LSJ** or a refutation in **RJ** such that the extracted counter-model is of minimal depth.

Keywords Intuitionistic propositional logic · Sequent calculi · Subformula property · Decision procedures · Counter-models generation

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