[2] F. Munini and F. Parlamento, *Admissibility of the structural rules in Kanger's sequent calculus for first order logic with equality*, *Logic Colloquium 2015*, this Bulletin, vol. 22 (2016), no. 3, p. 414.

[3] V. P. Orevkov, *On nonlengthening applications of equality rules*. ***Zapiski Nauchnyh Seminarov LOMI***, vol. 16 (1969), pp. 152–156 (In Russian) English translation in: ***Seminars in Mathematics*: *Steklov Math. Inst.*** (A. O. Slisenko, editor), Studies in Constructive Logic, vol. 16, Consultants Bureau, NY–London, 1971, pp. 77–79.

[4] F. Parlamento and F. Previale, *The cut elimination and nonlengthening property for the sequent calculus with equality*, ***Logic Colloquium***, 2016, `arXiv 1705.00693`.

▸ THOMAS PIECHA AND PETER SCHROEDER-HEISTER, *Intuitionistic logic is not complete for standard proof-theoretic semantics*.

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Prawitz conjectured that intuitionistic first-order logic is complete with respect to a notion of proof-theoretic validity [1,2,3]. We show that this conjecture is false. The notion of validity obeys the following standard conditions, where S refers to atomic bases (systems of production rules):

1. $\vDash_S A \wedge B \iff \vDash_S A$ and $\vDash_S B$.
2. $\vDash_S A \vee B \iff \vDash_S A$ or $\vDash_S B$.
3. $\vDash_S A \rightarrow B \iff A \vDash_S B$.
4. $\Gamma \vDash A \iff$ For all S: $(\vDash_S \Gamma \Longrightarrow \vDash_S A)$.
5. If $\Gamma \vDash A$ and $\Gamma, A \vDash_S B$, then $\Gamma \vDash_S B$.

Any semantics obeying these conditions satisfies the generalized disjunction property:

> For every S: if $\Gamma \vDash_S A \vee B$, where $\vee$ does not occur positively in Γ, then either $\Gamma \vDash_S A$ or $\Gamma \vDash_S B$.

This implies the validity ($\vDash$) of Harrop's rule $\neg A \rightarrow (B \vee C)/(\neg A \rightarrow B) \vee (\neg A \rightarrow C)$, which is admissible but not derivable in intuitionistic logic.

[1] D. Prawitz, *Towards a foundation of a general proof theory*, ***Logic, Methodology and Philosophy of Science IV*** (P. Suppes et al., editors), North-Holland, 1973, pp. 225–250.

[2] ———, *An approach to general proof theory and a conjecture of a kind of completeness of intuitionistic logic revisited*, ***Advances in Natural Deduction*** (L. C. Pereira, E. H. Haeusler, and V. de Paiva, editors), Springer, Berlin, 2014, pp. 269–279.

[3] P. Schroeder-Heister, *Validity concepts in proof-theoretic semantics*. ***Synthese***, vol. 148 (2006), pp. 525–571.

▸ EDOARDO RIVELLO, *On extending the general recursion theorem to non-wellfounded relations*.

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The principle of definition by recursion on a wellfounded relation [1], can be stated as follows: Let A be any set and let P be the set of all partial functions from A to some set B. Let $G: A \times P \rightarrow B$ be any function and let $R \subseteq A \times A$ be any binary relation.

Fact 1 (Montague): If R is wellfounded on A then there exists a unique function $f: A \rightarrow B$ such that

$$\forall x \in A\, (f(x) = G(x, f \restriction x^R)), \tag{1}$$

where $x^R = \{y \in A \mid y\, R\, x\}$.

If R is not wellfounded on the entire domain A, an obvious way of extending this method of definition is to identify a proper subset W of A on which R is wellfounded and to apply the principle to this set. The usual choice for W is the *wellfounded part* of R, defined as the set of all R-wellfounded points of A.

In my talk, after examining several different strategies to prove Fact 1, I will present a new approach to extend this method of definition to all kinds of binary relations. We look at subsets X of A on which R is not necessarily wellfounded, yet there exists a unique function