Classical Natural Deduction

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Prawitz (1965) added to intuitionistic natural deduction a rule of indirect proof restricted to atomic formulas. The resulting system admits the normalization of derivations for the $\vee, \exists$-free fragment of the language of predicate logic. In von Plato (1998) and Negri and von Plato (2001), Prawitz' rule is generalized into a *rule of excluded middle* permitting to conclude a formula C in propositional calculus if C is derived from an atom P and from its negation. The rule is admissible for arbitrary propositional formulas.

A generalization of the rule of excluded middle is given that applies to quantified formulas also. The result is a normalizing system of classical natural deduction for the full language of predicate logic. Normal derivations are well-founded, possibly infinitary trees. An example shows how to apply classical natural deduction in the proof theory of arithmetic.

References

Negri, S. and J. von Plato (2001) *Structural Proof Theory*, Cambridge University Press, in press.

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Prawitz, D. (1965) *Natural Deduction: A Proof-Theoretical Study.* Almqvist & Wicksell, Stockholm.

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