

## **Quasi-canonical Proof Systems and Their Semantics**

Quasi-canonical Gentzen-type systems with dual-arity quantifiers is a wide class of proof systems. Using four-valued non-deterministic semantics, we show that every system from this class admits strong cut-elimination iff it satisfies a certain syntactic criterion of coherence. As a specific application, this result is applied to the framework of Existential Information Processing (EIP), in order to extend it from its current propositional level to the first-order one.