1023-03-628   **Jeffery Zucker*** (`zucker@mcmaster.ca`), Dept of Computing, McMaster University, Hamilton, Ontario L8S 4K1, Canada. *Primitive Recursive Selection Functions for Provable Existential Assertions over Abstract Algebras.* Preliminary report.

We generalise to abstract many-sorted algebras the classical proof-theoretic result due to Parsons and Mints that an assertion $\forall x \exists y P(x, y)$ (where P is Σ_1^0), provable in Peano arithmetic with Σ_1^0 induction, has a primitive recursive (PR) selection function. This involves a corresponding generalisation to such algebras of the notion of *primitive recursiveness*. The main difficulty encountered in carrying out this generalisation turns out to be the fact that equality over these algebras may not be computable, and hence atomic formulae may not be decidable. The solution is to develop an appropriate concept of realisability for Σ-formulae (i.e. existential formulae over such algebras) and also for classical sequents of Σ-formulae. From this we can construct PR selection functions for Σ-formulae which are proved in a system with Σ-induction and classical logic.

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