

Basic Arithmetic

MOHAMMAD ARDESHIR
Department of Mathematics
Sharif University of Technology
P.O. Box 11365-9415
Tehran, Iran
mardeshir@sharif.edu

Abstract

Basic Arithmetic, **BA** is the basic logic, **BQC** equivalent of Heyting Arithmetic over intuitionistic logic and of Peano Arithmetic over classical logic. Ruitenburg in [1] axiomatized **BA** and using Kripke model theory, proved that **BA** has *disjunction* and *explicit definability* properties.

We continue our studies of **BA**. It is shown that **BA** is closed under the Friedman translation and is *not* closed under the Gödel translation. Some applications of the Friedman translation in **BA** are studied. Moreover, it is also proved that all nodes of a finite Kripke model of **BA** are classical models of \mathbf{IE}_1^+ , a fragment of Peano arithmetic with Induction restricted to the formulas made up of \exists , \wedge and/or \vee .

A natural extension of **BA**, **EBA**, which is still *weaker* than Heyting Arithmetic is introduced. It turns out that this extension of **BA** behaves very like to Heyting Arithmetic.

References

- [1] W. Ruitenburg. *Basic Predicate Calculus*, Notre Dame Journal of Formal Logic **39** (1998), 18-46.