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Intensionality in Epistemic Arithmetic

This paper compares two strategies for dealing with problems of intensionality in the framework of Epistemic Arithmetic.

The first strategy requires that the objects in the range of the first-order quantifiers (which are, in Epistemic Arithmetic, the natural numbers) can only be referred to in the epistemic language by means of *transparent* terms, whereas objects in the range of higher-order quantifiers can be referred to by means of *opaque* expressions. The second strategy also allows the formal language to contain *opaque* terms referring to objects in the range of the first-order quantifiers.

The first strategy was pursued in [FL] to construct a natural system of Epistemic Type Theory. The second strategy was sketched in [SH, 31-38].

It will be indicated how the intended interpretations of formal systems based on the two strategies differ. Moreover, it will be shown that the two strategies lead to different formal systems of higher-order Epistemic Arithmetic. In fact, the two strategies can already lead to different first-order systems of Epistemic Arithmetic. For if a description operator is available, then *opaque* terms refereing to objects in the range of the first-order quantifiers can be constructed.

References

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[SH] Shapiro, S. "Epistemic and Intuitionistic Arithmetic", In. S. Shapiro (ed.) *Intensional Mathematics*, Amsterdam, North-Holland, 1985, pp.11-46.