

- SOURAV TARAFDER, *Foundations of mathematics in a model of paraconsistent set theory.*

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Based on the Boolean-valued model construction of classical set theory, we constructed generalised algebra-valued models in [2]. We defined a three-valued algebra \mathbf{PS}_3 such that its logic is paraconsistent [1], and the \mathbf{PS}_3 -valued model $\mathbf{V}^{(\mathbf{PS}_3)}$ validates the negation-free fragment of ZF [2]. In [3], we studied ordinal numbers in $\mathbf{V}^{(\mathbf{PS}_3)}$.

In this talk, we shall discuss properties of the natural numbers in $\mathbf{V}^{(\mathbf{PS}_3)}$. We consider the ordinal ω (as defined in [3]) as the set of natural numbers and prove that this is an inductive set; from this, we conclude that mathematical induction holds in $\mathbf{V}^{(\mathbf{PS}_3)}$ and discuss the arithmetic of natural numbers in this model. Using the standard definition of sizes of sets via bijective functions, we shall define the notion of cardinality in our model and prove some classical theorems such as Cantor's theorem on the size of the power set of a set.

[1] TARAFDER, S., & CHAKRABORTY, M. K., *A paraconsistent logic obtained from an algebra-valued model of set theory, New directions in paraconsistent logic, 5th WCP* (Kolkata, India), (Jean-Yves Béziau, Mihir Kr. Chakraborty, and Soma Dutta, editors), vol. 152, New Delhi: Springer, 2016, pp. 165–183.

[2] LÖWE, B., & TARAFDER, S., *Generalized algebra-valued models of set theory., Review of symbolic logic*, vol. 8 (2015), no. 1, pp. 192–205.

[3] TARAFDER, S., *Ordinals in an algebra-valued model of a paraconsistent set theory, Logic and its applications, 6th ICLA* (Mumbai, India), (Mohua Banerjee and Krishna S., editors), vol. 8923, Berlin: Springer-Verlag, 2015, pp. 195–206.