Notre Dame Journal of Formal Logic
Volume XVII, Number 1, January 1976
NDJFAM

UN ESTUDIO DE LA LÓGICA ALGEBRAICA DESDE EL PUNTO DE VISTA DE LA TEORÍA DE CATEGORÍAS

LUIS M. LAITA

Summary

In this paper a model is provided for the bivalued propositional calculus and for Halmos' monadic and polyadic logics, by means of a preorder category which has unions, intersections, nul and conul objects, and a contravariant functor defined on it.

The set of propositions and of propositional functions are structured as categories the arrows of which are the implication functors. Quantifiers and logical constants are shown to be special functors. Implications, implications among implications and so on, are described respectively as arrows, functors, natural transformations, etc., so that logical formuli are studied as constructs of the theory of categories. An extension to the study of cylindric algebras is suggested at the end.

The paper is an extract of the more important points of a Ph.D. Thesis in Mathematics accepted by the Department of Mathematics of Universidad Complutense of Madrid, in August 1974. The author is indebted to Professors N. Cuesta and V. Muñoz of Salamanca and A. Dou of Madrid who first introduced him to the field of logic, and especially to Professor P. Abellanas of Madrid University, director of the dissertation, for his suggestions and advise, and to Professor B. Sobociński of Notre Dame University, under whose constant supervision he has worked for the last six years. The dissertation was done under a Grant provided by the Foundation Juan March of Spain.

Se presentan a continuación unas sugerencias para la formulación de un modelo de la lógica bivalente en el lenguaje de la teoría de categorías.

En la introducción se describen las "R-categorías" cuyos grafos corresponden a retículos con objetos inicial y final, y se prueban de forma diferente a la usual, algunas relaciones importantes de la teoría de retículos. Ello sugiere indirectamente, un método para hallar tautologías. En la sección 2, se construye una categoría especial, a la que se denomina "φ-categoría", un instrumento básico usado a lo largo de todo el trabajo. En las secciones 3 y 4 se traducen al lenguaje de las categorías, los

Received September 16, 1974