TSUKUBA J. MATH.
Vol. 12 No. 1 (1988). 97—114

A TWO-STORIED UNIVERSE OF TRANSFINITE MECHANISMS

Dedicated to Professor Shôkichi Iyanaga on his eightieth birthday

By

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Introduction.

In our previous article [4], we developed a theory of *methods* for our specific objective: to clarify the functional structure of ordinal diagrams. This theory was symbolized by HP (hyper-principle) for the reason that it rendered the foundations of a well-ordered structure far beyond ε_0. (For the structure of order type ε_0 we presented CP, the construction principle; see [2]). The theory HP can be regarded, however, as a general theory of *transfinite mechanisms* independent of ordinal diagrams, and it is of quite an interest in so far as a *mechanism* in our notion is a computational system which produces an object combined in one, given as an input a (transfinite) sequence of already produced objects. This mechanism is again disposed into the universe of objects of our concern. This is the idea behind HP.

Incidentally, what were called *methods* previously are here called *mechanisms*. The reason for this as well as a delicate distinction between methods and mechanisms will be explained in the sequel to this paper.

Now, in this article, we propose an extension of HP, symbolized by TM[2] (a *two-storied theory* of *transfinite mechanisms*), which is obtained from HP by allowing substitutions of term-forms of HP for free variables in type-forms, and hence the new universe (of mechanisms) is *two-storied*. That is, the objects in the universe of HP are regarded as the mechanisms belonging to the *first floor*, so to speak, and play the role of parameters to determine type-forms of the mechanisms *upstairs*. The function variables appearing in the original type-forms are then regarded as living in the basement.

In the sequel to this, an application of TM[2] will be presented; an extension of the transfinite definitions in [4] will be interpreted in TM[2].

Received October 17, 1986.