

COGNITIVE VISUALIZATION OF THE CONTINUUM PROBLEM AND MIRROR SYMMETRIC PROOFS IN TRANSFINITE NUMBERS MATHEMATICS.

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As is known, the infinite binary tree, say, T_R is the visual-geometric interpretation of the real numbers system on the segment $[0, 1]$: there is the 1 – 1- correspondence between the set $\{x\}$ of all $x \in [0, 1]$ and the set of all infinite paths beginning at the root vertex, say, V of T_R . Using one S.Kleene's idea, we place a mirror at the vertex V and reflect T_R symmetrically into the tree, say, T_L . Then we interpret the infinite binary paths of T_L as integers, say, x' . So, the graph complex T_L-T_R taken as a whole is a cognitive image of an 1-1- correspondence, say, Ψ between the infinite paths of T_R and T_L or, that is the same, between the sets of all real numbers $\{x\}$ and of all integers $\{x'\}$.

Investigations of the T properties gave the following main results [1 –4].

- 1) The Cantor transfinite ordinal integers theory is informally incomplete in the sense that there are transfinite integers, say $w' \in \{x'\}$, which are Ψ -corresponding to irrational fractions $x \in [0, 1]$. All such w' are different and have the same ordinal type ω . Consequently, $\text{Card}\{x'\} = \text{Card}\{x\}$.
- 2) The graph complex T_L-T_R is a cognitive visual-geometric image (representation) of the hyper-real numbers system. Some mirror-symmetric theorems of the form "If $P(x)$, $x \in \{x\}$, then $P'(x')$, $x' \in \{x'\}$, by force of Ψ " are proved. In particular, such the theorem: the transfinite-small real numbers (Liebniz' monades) exist iff Cantor's minimal transfinite-large integer ω exists. The visual-geometric interpretation of some transfinite objects (and their main properties) of modern Non-Standard Analysis is given.

REFERENCES

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