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SOME MEREOLOGICAL MODELS

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In this paper we show that the non-empty regular sets of any topological space form a Boolean algebra with zero deleted. In [1] it is shown that any Boolean algebra with zero deleted gives rise to a model of mereology which is "isomorphic" to it in the sense that

$$[AB]:A \leqq B \;.\!\equiv\!.\; \chi\{A\}\;\eta\;\mathbf{el}\langle\chi\{B\}\rangle,$$

where $\chi\{A\}$ and $\chi\{B\}$ correspond to A and B, and η is an analog of ontological ε. This paper will thus furnish us with a variety of mereological models. For example, Euclidean 3-space with the usual topology yields a model of atomless mereology.[1]

First we give some ontological preliminaries.

DO1 $[Aa]:A\,\varepsilon \sim(a) \;.\!\equiv\!.\; A\,\varepsilon A \,.\sim(A\,\varepsilon\, a)$

DO2 $[A\sigma]:A\,\varepsilon \bigcup\langle\sigma\rangle \;.\!\equiv\!.\; [\exists a]\,.\,A\,\varepsilon\, a\,.\,\sigma\{a\}.$

DO3 $[A\sigma]\therefore A\,\varepsilon \bigcap\langle\sigma\rangle \;.\!\equiv\!:\; A\,\varepsilon A : [a]:\sigma\{a\}\,.\!\supset\!.\,A\,\varepsilon\, a\,.$

We shall usually write $\bigcup\sigma$ instead of $\bigcup\langle\sigma\rangle$.

DO4 $[ab]\therefore a \subset b \;.\!\equiv\!:\; [A]:A\,\varepsilon\, a\,.\!\supset\!.\,A\,\varepsilon\, b$
DO5 $[ab]:a \circ b \;.\!\equiv\!.\; a \subset b\,.\,b \subset a$
DO6 $[ab]:\circ\{a\}\{b\} \;.\!\equiv\!.\; a \circ b$
DO7 $[A]:A\,\varepsilon \vee \;.\!\equiv\!.\; A\,\varepsilon A$
DO8 $[A]:A\,\varepsilon \wedge \;.\!\equiv\!.\; A\,\varepsilon A\,.\sim(A\,\varepsilon A)$
DO9 $[a]:!\{a\} \;.\!\equiv\!.\; [\exists A]\,.\,A\,\varepsilon\, a$

O1 $[\sigma a]:\sigma\{a\}\,.\!\supset\!.\; a \subset \bigcup\sigma$

O2 $[\sigma a]:\sigma\{a\}\,.\!\supset\!.\; \bigcap\sigma \subset a$

Now we introduce the notion of topological space into Leśniewski's

1. Concerning atomless mereology, *cf.* e.g., [2].

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