

# Does Mereotopology Have a Philosophical Value?

Bartłomiej Skowron

University of Wrocław  
Department of Logic and Methodology of Science  
bartlomiej.skowron@gmail.com

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# Plan of presentation

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## Mereology

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Mereology

Topology

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Topology

Mereotopology

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Mereology

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Mereotopology

Philosophical value of mereotopology

Bird's eye view — philosophical summary of the project called

mereotopology

# Mereology

$\mathfrak{M} = \langle M, \sqsubset \rangle$

A1  $\sqsubset$  is irreflexive

A2  $\sqsubset$  is transitive

A3  $sum(x, y) \wedge sum(x, z) \rightarrow x = z$

A4 for all  $x, y \in M$  there is  $sum(x, y)$

# Mereology

Mereology = Boolean Algebra (without null element)



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Pietruszczak A., *Metamereologia*, 2000.

# Mereology Criticism

”part of” is not transitive

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there is no sum for all  $x, y \in M$

# Transcendental Mereology

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*Updating Classical Mereology*

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**C**-category — **C**-mereology

**SET, TOP, GROUP, BOOLE** comes along with  
its own specific mereology

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**SET**-mereology = classical mereology



# Example of Transcendental Mereology

**GROUP**–mereology

”part of” — normal subgroup, subgroup, subset?

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Transcendetale: res, unum, aliquid, bonum, verum.

Topological Space

Closure, Interior

Continuity

Homeomorphism

Connectedness

Denseness

Boundary



# Other Association Between Topology and Philosophy

## Prototopology

J.R. Lucas, *The Conceptual Roots of Mathematics*

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## Philosophy of Topology, Topological Philosophy

# Barry Smith: Mereotopology: theory of parts and boundaries

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## Part

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Part

Interior Part

”Every entity is an interior part of universe”

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Barry Smith: Mereotopology: theory of parts and boundaries

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Point

# Mereotopology as a Mathematical Structure

Ian Pratt–Hartman, *First Order Mereotopology*

Let  $X$  be a topological space. A mereotopology over  $X$  is a Boolean subalgebra  $M$  of  $RO(X)$  such that, if  $A$  is an open subset of  $X$  and  $p \in A$ , there exists  $R \in M$  such that  $p \in R \subseteq M$ .

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Example:  $ROS(\mathbb{R}^n)$  is mereotopology over  $\mathbb{R}^n$ ,  $n \in \mathbb{N}$

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Elements of mereotopology = regions

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Spatial perspective

# Continuity



# Continuity

## Place

Continuity

Place

Part/whole

Continuity

Place

Part/whole

Husserl's theory of part and whole

Continuity

Place

Part/whole

Husserl's theory of part and whole

Hole

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Part/whole

Husserl's theory of part and whole

Hole

One–Many

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