

## **“Primary Relations” and a new form of dynamic identity**

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### **Abstract**

Nowadays there is a growing need for elaborating new instruments of logic to express the dynamic interrelatedness and self-referential nature observed in various phenomena. This has helped lead to increased interest in interdisciplinary research. Some modern authors such as Cellucci [1] state that the principal task which the diverse sciences face in our times is that of developing a new form of logic for open systems - a logic capable of dealing with a body of knowledge in continual expansion. Indeed this author goes so far as to affirm that such a step forward would imply a change of paradigm.

The work of E. De Giorgi, M. Forti and G. Lenzi on “Axiomatic Systems for 2000...” [2,3] proposes “a new, non reductive, self-descriptive, open-ended axiomatic framework” which is intended to be applicable not only to the foundations of mathematics, logic and computer science, but which can serve also as a common language for different fields of natural and human science [4]. This axiomatic system is based on the sole primitive notions of relations and qualities.

Prior to this, Lesniewski [5] sought a universal language to meet the problem of describing self-referential phenomena, while avoiding the antinomies to which other logical systems had led. His system is based on the key idea of the relation of “being a part” and gives rise to a logical system which is open and in continual expansion [6,7].

However neither De Giorgi's nor Lesniewski's system provides a clear method for describing the pattern of “dynamic oneness” or a kind of “dynamic identity” which seems to emerge from self-referential phenomena like fractals.

In this presentation I would like to propose the first attempt of such formulation based on the axiomatic language of De Giorgi and incorporating the mereological intuition of Lesniewski.

[1] C. Cellucci, *Le ragioni della logica*, (Laterza, Roma, 1998).

[2] E. De Giorgi, M. Forti, G. Lenzi, *Verso i sistemi assiomatici del 2000 in matematica, logica e informatica*, Scuola Normale Superiore di Pisa, *Preprints di Matematica* 26 (1996) 1--19.

[3] M. Forti and G. Lenzi, *A general axiomatic framework for the foundations of Mathematics, Logic and Computer Science*, *Rend. Mat. Acc. Naz. Sci. d. XL* (1997) 1--32.

[4] L. Galleni and M. Forti, *An axiomatization of biological concepts within the foundational theory of Ennio De Giorgi*, *Biology Forum*, 92 (1999) 77--104.

[5] S. Lesniewski, *On the Foundations of Mathematics*, Edited by J.T.J.Szrednicki, S.J. Sturma and D.Banett, *Nijhoff International Philosophy series 44* (Netherlands, 1992), in original version S. Lesniewski, *O podstawach matematyki*, *Przeglad filozoficzny*, XXX (1927) 164--206; XXXI (1928) 261--291.

[6] A. Tarski, *Pisma logiczno-filozoficzne*, ed. J. Zygmunt, (PWN Warszawa, 1995).

[7] Z. Tworak, *Klamstwo klamcy i zbior zbiorow. O problemie antynomii* (Wydawnictwo Naukowe UAM, Poznan, 2004).