

**HABILITATION THESIS**  
**Diagonal Structures in Logical and Philosophical Argumentation**  
**(DSLPA)**

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**Summary**

The Habilitation Thesis DSLPA is a systematic exposition of an investigation of some crucial results in the logical-mathematical-philosophical domain, represented by the incompleteness phenomenon. Thus, two are the lines making the object of this investigation, one focused on the logical and mathematical results as such, implied by the idea of diagonalization (self-reference), and the other based on the essential shifting in the philosophical conceptualization, induced by the existence of these diagonal structures. Essentially, these lines determine the way of elaboration of the thesis DSLPA, according to the methodology specified in the CNATDCU documents.

The Section I, *Scientific and professional activity*, is divided into 8 subdivisions. The first, Scientific publications (1), specifies distinctly the volumes of the author (1.1), scientific articles and studies (1.2), translations (1.3) and reviews (1.4).

Each of the three volumes of mathematical logic ([V.D. 2002], [V.D. 2007], [V.D. 2014]) is distinctly presented, by specifying the *subject* (mentioned

in the respective chapters) and the concrete *way* in which the analysis of these topics is effectively carried out.

The field of these topics, claimed by the analysis of the diagonal structures, taken into consideration by the author of the DSLPA, contains the following: the propositional logic (developed from many perspectives: truth functions, analytic tableaux, axiomatic, natural deduction, the sequents-calculus, resolution), the predicate logic (developed from the already mentioned points of view), the formal system of Peano Arithmetic, recursive functions and relations, Gödel's incompleteness theorems, recursive undecidability, modal logic. To these formal developments, elaborated in the space of 717 pages, I add a special analysis (Scholz-Hasenjaeger-type) of the way the diagonalization is effective in the nondecidability of the predicate calculus, a topic developed in [V.D. 2014] in the space of 136 pages.

The scientific articles and studies (1.2) apply philosophically the logical and mathematical results concerning the diagonal structures. Predominant, the perspectives making the object of these applications are the following: the nonalgorithmic character of mathematical thinking (i.e. the Lucas-Penrose Argument), the thesis "meaning transcends use" and, consequently, the concept "arithmetical understanding". The key idea of these three perspectives is that of the limit of our conceptualizations, either in the form of paradoxical constructions, or in the form of some cardinal theorems (e.g. Gödel's, Tarski's, Löb, Montague, Thomason, Turner), or in the form of semi-computability of the Kleene's predicate  $(\exists y)T(x,x,y)$ , closely related to the "halting problem". All those investigations argue against the Lucas-Penrose Argument, against Wittgenstein's view concerning Gödel's theorems, and against Priest's idea of paraconsistency.

The preceding field of investigations is supplemented with a volume regarding the german phenomenology and, consequently, with the studies applying the diagonal structures in this field. More exactly, the subject of this analysis is the way in which two fundamental notion, "logic" and "truth" are

connected in order to construct a philosophical logic in Husserl's and Heidegger's views. A special analysis is devoted to what is usually called "the apory of thematization" with reference to Heidegger's "Analytik des Daseins". This apory is a consequence of his radical distinction between "ursprüngliche Wahrheit" (originary truth) and "apophantische Wahrheit" (the truth of a sentence). This apory sounds: If the originary meaning of truth reveals itself non-thematically, then how can it be thematized? Does such an apory have any solution in Heidegger's work? Not at all, as I have argued in my papers.

The other subdivisions contain my dissertations to the national and international conferences (2), the organization of national conferences (3), the quality of being a member in the scientific board of some scientific journals (4), my involvement in scientific programs (5), international collaborations (6), further involvements (7) and, finally, my professional activity (8). This last subdivision exposes the structure of my courses in logic: General Logic, Propositional Logic, Predicate Logic, Modal Logic and Argumentation and Critical Thinking.

The section II, *Scientific projects, directions of investigation and the implementation of the results*, specify the chosen subjects in order to investigate in the next future, concerning the main topic: diagonal structures. I add two books (R. Smullyan, *Gödel's Incompleteness Theorems*, and D. Hilbert and W. Ackermann, *Grundzüge der theoretischen Logik*, Sechste Auflage) taken into consideration in order to be translated. Finally, I describe the ways these results can be implemented in the academic activity.

The habilitation thesis DSLPA end with a third section: *Bibliographic References* to the main topic of my researches: diagonal structures in logical and philosophical argumentation.