# Kant's critique of the Wolffian 'mathematical method' and the ontological question of principles in the *Deutlichkeit* (1764)

JESSICA SEGESTA[1]

**Abstract**

This paper examines some key aspects of Kant's critique of Wolffian mathematical method in the *Deutlichkeit* (1764). The aim is to show how the ontological question of principles underlies this critique. To do so, I will first show that Wolff identifies the mathematical method with a universal model of inquiry, which is based on the formal principles of rationalist ontology. I will therefore focus on a key element of this model, namely that of definition. In doing so, I will be able to show that it is precisely by looking at the process of definition that Kant makes his distinction between the synthetic model of mathematics and the analytic model of philosophy. Finally, I will show that for Kant, albeit differently, both these models are not reducible to the formal principles of rationalist ontology.

**Keywords:** Wolff, Kant, Mathematical method, Ontology, Metaphysics.

## La crítica de Kant al 'método matemático' wolffiano y la cuestión ontológica de los principios en la *Deutlichkeit* (1764)

**Resumen**

Este artículo examina algunos aspectos clave de la crítica de Kant al método matemático wolffiano en la *Deutlichkeit* (1764). El objetivo es mostrar cómo la cuestión ontológica de los principios subyace a esta crítica. Para ello, mostraré en primer lugar que Wolff identifica el método matemático con un modelo universal de indagación en el que subyacen los principios formales de la ontología racionalista. Me centraré, por tanto, en un elemento clave de este modelo, a saber, el de la definición. Al hacerlo, podré mostrar que es precisamente observando el proceso de definición que Kant establece su distinción entre el modelo sintético de las matemáticas y el analítico de la filosofía. Por último, mostraré que en Kant ambos modelos, aunque de manera diferente, no son reducibles a los principios formales de la ontología racionalista.

**Palabras clave:** Wolff, Kant, Método matemático, Ontología, Metafísica.

[1] University of Palermo, Dipartimento di Scienze Psicologiche, Pedagogiche, dell'Esercizio Fisico e della Formazione. Contact: jessica.segesta@unipa.it. ORCID: https://orcid.org/0000-0002-9952-4132.



*Revista de Estudios Kantianos*
Vol. 8, Núm. 2 (2023): 432-451

ISSN-e: 2445-0669
https://www.doi.org/10.7203/REK.8.2.27512

## 1. Introduction

From the very beginning, Kant's production seems to be guided by the intention to prepare a 'reform of metaphysics' (de Boer, 2020), aimed at securing its cognitions to a certain and trustworthy form of knowledge. Already in his first work on the so-called 'living forces' (1747), Kant openly expresses the urgency of a methodical reflection on metaphysics and its alleged progress (AA 1:30). But it is only with the publication of the text of the *Nova Dilucidatio* (1755) that his dissatisfaction with the ontological assumptions of the '*Schulmetaphysik*' (see Wundt, 1924) becomes clearer and turns into an outright critique of its fundamental principles, aiming to show their inability to explain the empirical complexity of the real world. In particular, Kant questions the alleged supremacy of the principle of non-contradiction (AA 1:388), revealing its merely formal nature.[2] He then introduces two new principles–that of succession and that of coexistence–for the concrete application of the renewed principle of the determining ground (AA 1:411).

In this study, I will show that the ontological question of principles also underlies Kant's critique of the Wolffian mathematical method in the essay written for the competition announced by the Royal Academy of Sciences in Berlin for the year 1763,[3] whose full title is: "Untersuchung über die Deutlichkeit der Grundsätze der natürlichen Theologie und der Moral".[4] I shall carry out this task as follows. I will begin in section 1.1. by introducing the Wolffian concept of mathematical method and showing that it is essentially a 'logical model' of inquiry, the structure of which follows that of rationalist ontology. In section 1.2. I will then focus on a key aspect of this method: the definition. In particular, I will briefly discuss the ways in which, according to Wolff, it is possible to acquire the definitions that underlie any demonstrative process. This will allow us to better focus on Kant's position with respect to both mathematics and philosophy. In section 2. I will indeed show that Kant's conception of mathematical inquiry differs from Wolff's,

[2] The formal character of this principle is clearly brought out in *Herder's Metaphysics* (AA 17:08).

[3] The record of the discussion is dated May 28, 1761, and testifies that Professor Sulzer proposed the theme for the 1763 contest (*cf.* Winter, 1957, p. 633). The question consisted of an investigation into the evidence of the proofs of the truths of metaphysics. For a general overview of the topic, *cf.* Martínez (2018, pp. 238-242).

[4] From Kant's letter to Formey (the secretary of the Royal Academy of Berlin) dated June 28, 1763, we learn that the latter received the Kantian manuscript at the end of December 1763. Regarding the methods and the timing of the composition of the work, see de Felice (2011, p. 166).



*Revista de Estudios Kantianos* ISSN-e: 2445-0669
Vol. 8, Núm. 2 (2023): 432-451 https://www.doi.org/10.7203/REK.8.2.27512

and that the way he interprets his definitional processes is what properly determines for his cognitions a kind of 'certainty' that cannot be traced back to the formal principles of the rationalist ontology. Finally, in section 3. I will discuss Kant's understanding of philosophical method and of his kind of certainty.

1.1. Wolff and the 'mathematical method'

In the *Deutlichkeit* Kant openly criticizes the Wolffian tradition for its use of the 'mathematical method' in philosophy. So let us first clarify exactly what Wolff meant by this expression. In fact, despite what the name might suggest, when one speaks of the mathematical method in relation to Wolff, one is not at all referring to an epistemological model typical of the mathematical disciplines. Wolff makes this quite clear in the preface to the *Aëreometria Elementa* (1968 [1709]): "the mathematical method is not said to be mathematical because of the fact that it is peculiar to the mathematical disciplines, but because so far only mathematicians have been able to take profit from it in their subjects" (GW, 2, p. 37).[5]

Similar words are used in the *Kurzer Unterricht von der mathematischen Lehrart,* a short essay placed at the beginning of the *Anfangsgründe aller mathematischen Wissenschaften* (1968 [1710]): "we call it mathematical, sometimes also the geometrical method, because until now almost only the mathematics, particularly in geometry, made use of it in all things in the most meticulous way" (GW, 1, 12, § 51; see also Marcolungo, 1989, pp. 11-38; Tutor, 2004, pp. 32-36).

Because of the confusion caused by this label, Wolff decided to discard it in his Latin works in favor of the more general and inclusive expression "*methodo scientifica pertractata*" (Basso, 2004, p. 51; Paolinelli, 1974, pp. 37-38). Indeed, behind such an evocative label lay the Wolffian ideal of a method of inquiry of universal value, that is, one that could be applied to all disciplines regardless of the diversity of their objects. In other words, for Wolff, to speak of 'mathematical method' was essentially to refer to a general model of inquiry that had already been successfully applied in mathematics, especially by the geometers.

[5] References to Wolff's *Gesammelte Werke* will be given indicating division [*Abteilung*], volume [*Band*] and either page or paragraph number. English translation of the text is my own.



*Revista de Estudios Kantianos* ISSN-e: 2445-0669
Vol. 8, Núm. 2 (2023): 432-451 https://www.doi.org/10.7203/REK.8.2.27512

In this section I will focus on Wolff's mathematical method as a general scientific model that must be applied in philosophy in order to obtain knowledge that has the same kind of 'certainty' as that achieved by mathematics. As is well known, it is precisely against this idea of a universal and unique method[6] for all sciences that Kant rages in *Deutlichkeit*. Before explaining the main features of this method, however, a brief statement should be made.

The idea of a universal methodology of knowledge, valid for all disciplines despite the differences in their objects, was certainly not a Wolffian invention. In fact, Descartes had already conceived of a similar idea (see Malter, 1979, pp. 576-577) under the name '*sapientia universalis*', and it was from him that Wolff probably drew his inspiration.[7] Even for Descartes, there was indeed a *unique* and *universal* method of knowledge, particularly suited to the mathematical research, but not specifically mathematical. The uniqueness and universality of this method derive from the fact that all our cognitive faculties can be traced back to a single faculty: the so-called '*ingenium qua intellectus*' (Reg. XII). With due differences, even for Wolff it is possible and even necessary to follow a univocal methodology of investigation, since all our knowledge is ultimately traceable to a single faculty, that of thought in general.[8] In light of this, one could say that Wolff's way of justifying the idea of a single and universal method capable of giving the same degree of certainty to all our knowledge is essentially the same as that of Descartes.[9] In this regard, Rudolf Malter has spoken of a genuine "*monism de la méthode*" (1979, p. 577) as a central component of both Cartesian and Wolffian rationalism, and of what Kant's critique in the early 1760s was directed against the peculiar form that this had taken in Wolff's philosophy and more generally, in scholastic metaphysics.

[6] In this regard, Vogt emphasizes Kant's methodological dualism in *Deutlichkeit* (2005, pp. 129-148).
[7] According to Marco Paolinelli, E. W. von Tschirnhaus, not R. Descartes, was the real source of inspiration for the Wolffian method (1974, p. 8). For most commentators, Tschirnhaus would indeed have been the inventor of the "geometric" or "mathematical method" adopted by the School philosophers (see de Vleeschauwer, 1931, pp. 651-677; Wundt, 1924, p. 32). Martin Schönfeld argued against this these (1998, pp. 57-76).
[8] J. I. G. Tutor has highlighted the fact that, for Wolff, the rules of the method are essentially the rules of logic, since the latter is "*eine deutliche Erklärung der natürlichen Art des Denkens*" (2018, pp. 86-87).
[9] Since Descartes, the certainty of knowledge has been a quality associated with the legitimacy of the method used to obtain knowledge. In his *Discourse de la methode*, Descartes identifies four fundamental rules: the rule of evidence, the rule of analysis, the rule of synthesis, and finally the rule of enumeration.



*Revista de Estudios Kantianos* ISSN-e: 2445-0669
Vol. 8, Núm. 2 (2023): 432-451 https://www.doi.org/10.7203/REK.8.2.27512

The continuity between Descartes and Wolff is remarkable in terms of the ideal of a unique and universal method, and therefore deserves to be taken into a serious consideration. However, a detailed discussion of this issue is completely beyond the scope of this study. Rather, my aim here is to explore the underlying *ontological motives* that guided Kant's critique of Wolff's mathematical method within the *Deutlichkeit.* To do this, I will first show that when Wolff speaks of the mathematical method as a unique and universal method of inquiry, he is referring to a 'logical model' whose argumentative structure is capable of reproducing the real connections that reign in ontology. But let us proceed step by step.

Looking at the structure of Euclid's geometrical proofs, Wolff argues that in them one always "starts from the definitions, proceeds to the axioms, and from here to the theorems and the problems" (*Kurzer Unterricht*, GW, 1, 12, § 1). This would be the structure to be followed in any investigation according to the mathematical method. Wolff's aim, however, is not at all to derive a methodological scheme from the structure of the Euclidean proofs, but rather to recognize *in them* the application of a logical model[10] that should become a universal standard of any scientific inquiry. For this reason, Wolff would reinterpret the structure of these proofs a few years later (Gava, 2018, p. 280). More precisely, in his *Deutsche Logik* (1968 [1712]),[11] he characterizes the structure of Euclid's geometric proofs as purely "syllogistic"[12] (GW, 1, 1, § 173) and identifies their basis in the principle of non-contradiction (GW, 1, 1, § 165). And it is this last point that, in my opinion, deserves special attention.

It is very important to remember that for Wolff, as for most of the other rationalists such as A. G. Baumgarten, the principle of non-contradiction is not just a principle of knowledge, but a truly ontological one. It is, in fact, a principle that expresses the 'being of things' even before it expresses their knowability (see Lorini, 2016, p. 53). It is not by chance that the notion of '*ens in genere*' that Wolff places at the root of his ontology is identified by its own possibility (*Philosophia prima*, § 135; see Effertz, 2018,

[10] Wolff's idea is here that the mathematical arguments underlying Euclid's geometric demonstrations would be perfectly traceable to the logical principle of non-contradiction (see Basso, 2004, p. 54).
[11] Which original full title is: *Vernünftige Gedanken von den Kräften des menschlichen Verstandes und ihrem richtigen Gebrauche in Erkennntnis der Wahrheit*.
[12] The influence of Leibniz was decisive in this respect (see Campo, 1939, p. 45; Corr, 1972, pp. 327-329). According to Lorini, it was precisely the re-evaluation of the syllogistic component that enabled Wolff in these years to embark on a path of emancipation of logic from mathematics (2016, pp. 50-51).



*Revista de Estudios Kantianos* ISSN-e: 2445-0669
Vol. 8, Núm. 2 (2023): 432-451 https://www.doi.org/10.7203/REK.8.2.27512

pp. 139-152), and the criterion for defining the latter is properly the non-contradictory status of its own concept (§ 85). Moreover, as is well known, for Wolff the principle of sufficient ground, which provides the reason for the intelligibility of all that is, would somehow be demonstrable[13] from the principle of non-contradiction. This is, as Wolff himself explicitly argues, the basis of every possible demonstration (§ 54n.).

These brief considerations are sufficient to understand why Wolff, in a short essay entitled "*De habitu philosophie*" (1968 [1729]), admits that the argumentative structure used for mathematical demonstrations is basically "the result of the notion of entity which we have analyzed in the *philosophia prima*, plus other principles established there" (GW, 2, 34.1, § 8). This structure would, in fact, trace "the connection between determinant and determinate that reigns in ontology" (GW, 2, 34.1, § 8). The mathematical method to which Wolff refers would thus find its legitimation in the structure of entities themselves. For him, the order to be followed in scientific arguments always requires precise definitions and a strict connection between antecedent (determinant) and consequent (determined). Such a connection turns out not to be arbitrary, but absolutely necessary (de Felice, 2016, p. 94), insofar as it reproduces the so-called '*ordo rerum naturae*'. Indeed, in Wolff's view, the same certainty of Euclid's geometric proofs would be ensured by their own ability to reproduce such a connection between the natural things. And this is probably, to use Kant's words, the 'secret' of rigorous thinking that the Wolffian philosophers thought they could learn from the geometricians.

The unique Wolffian method would not be mathematical or geometric at all, but essentially an *ontological* one (Basso, 2004, p. 52). It is not, therefore, as it might seem, philosophy that must borrow the method from mathematics: for Wolff, it is the ontology, that is, the *philosophia prima*, that becomes the matrix of every demonstrative process and the basis of all certain knowledge.[14] In this respect, the words of Paola Basso seem particularly relevant to me:

[13] In the *Deutsche Metaphysik* we find three attempts in this direction (§ 10). In the *Ontologia*, however, Wolff recognizes the difficulties of such a demonstration and finally admits the axiomatic character of the principle of sufficient reason (§ 77). On this topic, see de Felice (2016, pp. 91-113).

[14] This means that both mathematical and philosophical methods find their legitimation in the particular structure of the entity, since ontology is precisely what the entire Wolffian epistemology is based on (*cf.* de Felice, 2016, p. 94). Also, according to Paolinelli, the Wolffian mathematical method would



*Revista de Estudios Kantianos* ISSN-e: 2445-0669
Vol. 8, Núm. 2 (2023): 432-451 https://www.doi.org/10.7203/REK.8.2.27512

> Here the relations seem to be reversed: it was no longer — as it had seemed — metaphysics that "borrowed" the geometric method, but geometry itself that followed a method derived from the structure of entities, a method that we could call, in other words, "ontological"! But not only that […] ontology then turns out to be not only the matrix of the demonstrative method, but also the basis of all certain knowledge, since it was only the legislative discipline of what it is that could be above any doubt (2004, p. 52, my trans.).[15]

As we have seen, one of the key elements of Wolff's unique method is the syllogistic form of the demonstrative process. But no less important is another element that I have only mentioned so far: the definition. According to the Wolffian model, the definition is indeed the 'starting point' for the development of any demonstrative process, including that of philosophy. And it is precisely against this idea that Kant directs his critique in the *Deutlichkeit* (AA 2:293). In order to better understand this critique, it is then important to take a closer look at how Wolff understands the process that leads to the definition.

### 1.2. The definitions as the *starting point* of demonstrations

As I showed in the previous section, when Wolff speaks of 'mathematical method' he is properly referring to a logical model, firmly grounded in the ontological realm, that should become a universal standard for all scientific inquiry. In his *Deutsche Logik*, Wolff points out the key moments of this logical model: it always "starts from the definitions (*Erklärungen*), proceeds to the axioms (*Grundsätze*), and from here to the theorems (*Lehrsätze*)" (GW, 1, 12, § 1). In this order of operations, the definition is the starting point. So let us see what exactly Wolff means by it.

In the *Deutsche Logik*, Wolff identifies definitions with concepts that are clear, distinct, and complete (GW, 1, 1, p. 141). He then defines a "clear

ultimately be based on ontology and more specifically on the principle of non-contradiction and the principle of sufficient reason (1974, pp. 3-39). In this regard, W. Risse has spoken of a progressive "devaluation (*Abwertung*)" in the Wolffian estimation of mathematics, which is justified by the gradual clarification of the relations between mathematical method and its ontological foundations (1964, p. 583).

[15] "Ecco che i rapporti sembrano capovolti: non era più – come era parso – la metafisica a 'prendere a prestito' il metodo geometrico, bensì la geometria stessa a seguire un metodo dedotto dalla struttura degli enti, un metodo che, in altre parole, potremmo chiamare 'ontologico'! Ma non solo […] l'ontologia si rivela poi, oltre che matrice del metodo dimostrativo, anche la base di ogni conoscenza certa dal momento che solo la disciplina legislatrice di ciò che è poteva essere al di sopra di ogni dubbio".



Revista de Estudios Kantianos
Vol. 8, Núm. 2 (2023): 432-451
ISSN-e: 2445-0669
https://www.doi.org/10.7203/REK.8.2.27512

concept" as one that we are able to apply in an appropriate way (GW, 1, 1, p. 126), even though we may not be able to discern all the notes [*Merkmale*] that the concept entails. We then speak of a 'distinct concept' when we have a clear representation of its notes that enables us to recognize the things to which it can be applied. Finally, if these notes are sufficient to apply the concept correctly in all circumstances, then the concept is "complete" (GW, 1, 1, p. 129). This is especially true for the "definition of words" or "nominal definitions" which, according to Wolff, provide an adequate basis for proof in the sciences (GW, 1, 1, p. 145).[16] However, there is another aspect related to the definition that deserves special attention for the purposes of this study. It concerns the 'way' in which, according to Wolff, such clear, distinct, and complete concepts can be obtained.

In the *Deutsche Logik* (1713), Wolff argues that these concepts can be obtained either through the senses (GW, 1, 1, p. 124), or by abstracting what different concepts have in common (GW, 1, 1, pp. 136-137), or again by modifying a concept by adding some properties to it or by determining some of its properties in a different way (GW, 1, 1, p. 139). In the so-called *Lateinische Logic* (1968 [1728])[17] these modes are reduced to three operations: 1. reflection, 2. abstraction, and 3. arbitrary determination (GW, 2, 1.2, § 716). In particular, reflection is used to obtain the concept of something that we have experienced through the senses. By abstraction, on the other hand, we are able to produce classes of concepts by recognizing what different concepts have in common. Finally, arbitrary determination allows us to 'create' new concepts by modifying or combining already known concepts in different ways.

It is not my intention to go into a detailed analysis of the above processes. I will simply point out that, according to Wolff, there are different ways of acquiring such clear, distinct, and complete concepts of things (nominal definition) or of their origin (real definition), which are the starting point of any demonstrative process. In this regard, two elements are particularly relevant to our investigation: 1) for the acquisition of the

[16] In this regard, Gabriel Gava emphasizes that this sentence should not be understood as claiming that we need only "nominal definitions" in science, but rather that scientific definitions must always include a "nominal" part that identifies the fundamental features of a concept by means of analysis (2018, p. 281).

[17] Which full original title is: *Philosophia rationalis sive logica, methodo scientifica pertractata, et ad usum scientiarum atque vitae aptata. Praemittitur discursus praeliminaris de philosophia in genere.*



*Revista de Estudios Kantianos* ISSN-e: 2445-0669
Vol. 8, Núm. 2 (2023): 432-451 https://www.doi.org/10.7203/REK.8.2.27512

*elementa definitionum*, Wolff uses analytical tools that appeal to experience,[18] but also 'synthetic' procedures, such as the arbitrary determination of concepts; 2) according to Wolff, there is no a specific discipline that is devoted to the acquisition of definitions (Malter, 1979, p. 580). Indeed, logic, for its part, would only provide the general principles according to which a concept satisfies the formal requirements of definition, but it is not the *Organon* that produces them. Nor can ontology (*philosophia prima*) be the discipline devoted to such a task: it always proceeds in a demonstrative way, i.e., starting from definitions.

Keeping these two elements in mind will allow us to better focus on Kant's position within *Deutlichkeit*. More specifically, with regard to point 1), I will show that it is precisely by excluding analytic operations from the definitional process of mathematics, that Kant identifies a kind of certainty for its cognitions that cannot be explained by recourse to the formal principles of rationalist ontology alone. With regard to point 2), I will then show that, for Kant, it is a particular kind of analysis, which does not lead to definitions, that is the main task of the general metaphysics.

## 2. Kant and the *synthetic method* of mathematics

Kant's position on the question posed by the Berlin Academy of Sciences is well known. It can be summarized as follows: it is not possible to make use of the mathematical method in philosophy, and indeed nothing has been more harmful to it than the imitation of it (see AA 2:283). Nevertheless, when Kant speaks of the mathematical method, he has something different in mind than Wolff (Gava, 2018, p. 284).[19] However, this does not affect the value of the Kantian critique. But let us see more in detail.

Like Wolff, Kant argues that mathematics must have definitions as its starting point: "In mathematics I begin with the definition of my object, for example, of a triangle, or a circle, or whatever" (AA 2:283). In mathematics

[18] Even if for Wolff it is possible to obtain concepts by arbitrary determination, for him definitions are for the most part definitions of *empirically given* concepts (*cf.* Engfer, 1982, pp. 173-193). L. Cataldi Madonna also emphasizes the role of experience in the process of acquiring Wolffian definitions (2001, chaps. 1-2; 2007). Rudolph, for his part, argues that it is not a single experience, but an "*Erfahrungzusammenhang*" that counts as a premise in Wolff's proofs (2007, p. 15-24). On this topic see also de Felice (2011, pp. 173-193).
[19] In this regard, Langbehn argued that Kant's critique in the *Deutlichkeit* is not at all directed against the Wolffian mathematical method (2014, pp. 17-40).


Revista de Estudios Kantianos ISSN-e: 2445-0669
Vol. 8, Núm. 2 (2023): 432-451 https://www.doi.org/10.7203/REK.8.2.27512

the definition is indeed the "first thought" (AA 2:281).[20] I can have of the thing being defined. However, Kant's view of mathematical definitions is quite different from Wolff's. The latter argued that the definitions posed at the beginning of a demonstrative chain should be the result of an analysis of the 'essential marks' of the concept. This means that, for Wolff, mathematics always involves operations of an analytic nature, such as reflection and abstraction (see, for example, GW, 1, 12, §§ 17, 20). Kant, on the other hand, completely excludes the use of such a kind of operations within mathematical knowledge. In the first reflection of the *Deutlichkeit* we read:

> There are two ways in which one can arrive at a general concept: either by the *arbitrary combination* of concepts, or by *separating out* that cognition which has been rendered distinct by means of analysis. Mathematics only ever draws up its definitions in the first way. For example, think arbitrarily of four straight lines bounding a plane surface of that the opposite sides are not parallel to each other. Let this figure be called a trapezium (AA 2:276).

And also: "For mathematics never defines a given concept by means of analysis; it rather defines an object by means of arbitrary combination" (AA 2:280).

According to Kant, the general concepts from which mathematics starts its proofs can only be obtained by 'arbitrary connection' [*willkürliche Verbindung*] of other concepts. In order to describe the way in which mathematics can arrive at its 'general concepts' [*allgemeinen Begriffe*], Kant therefore refers to a very specific strategy among those mentioned by Wolff: the arbitrary determination.[21] But Kant understands this in a different way. As Gabriele Gava has well pointed out, for him the arbitrary combination "is not only a method of *obtaining* concepts, but also a way of *defining* them" (2018, pp. 287-288). That is to say, in Kant's view, the act of acquiring concepts and the act of defining them are in somehow perfectly congruent in mathematics.

[20] Kant's identification of the definition as the starting point for mathematical demonstration reflects his acceptance of Euclid's model of demonstration (Gava, 2018, p. 287). In philosophy Kant opposes this method to that used by Newton in the natural sciences.

[21] H. J. Engfer suggests that this idea of the arbitrary combination of concepts derives from the notion of the so-called *ars combinatoria* (1982, p. 64).



*Revista de Estudios Kantianos* ISSN-e: 2445-0669
Vol. 8, Núm. 2 (2023): 432-451 https://www.doi.org/10.7203/REK.8.2.27512

> The concept which I am defining is not given prior to the definition itself; on the contrary, it only comes into existence as a result of that definition. Whatever the concept of a cone may ordinarily signify, in mathematics the concept is the product of the arbitrary representation of a right-angled triangle which is rotated on one of its sides. In this and in all other cases the definition obviously comes into being as a result of synthesis (AA 2:276).[22]

Conceptual analysis, which for Wolff was essentially the canon (Malter, 1979, p. 582) of procedures for obtaining definitions, is here completely excluded by Kant. For him, the fact that mathematics can begin its proofs with the definitions is closely related to the *synthetic origin* of its general concepts:

> In mathematics, the definitions are the first thought which I can entertain of the thing defined, for my concept of the object only comes into existence as a result of the definition (*durch die Erklärung allererst entspringt*). It is, therefore, absolutely absurd to regard the definitions as capable of proof (AA 2:281).

All of this, as we have seen, is very far from what Wolff had in mind when he spoke of 'mathematical method' and Kant was of course aware of this. He shows this when he openly refers to Wolff as one of those who erroneously claim to look at the geometrical questions "with a philosophical eye" (AA 2:277); that is, to use analytical strategies in order to define their mathematical concepts.

The different ways in which Wolff and Kant respectively interpret the process of obtaining and defining concepts obviously have consequences that affect the nature of the certainty of the mathematical proofs. For Wolff, the arbitrary composition that allows the acquisition of concepts is not identified with a particular method of definition: this always requires an analytical a process. And it is on the basis of such "analytical definitions" that

[22] In the *Critique of pure reason*, as is known, Kant further characterizes this synthetic method of definition, for which he will use the term "construction" (KrV, B741). This method, as it will explain in the *Transcendental doctrine of method*, would have be able to guarantee the "objective reality" of concepts insofar as it would provide their a priori representation in the pure intuition (KrV, A729/B757). In the early 1760s, Kant has not yet adopted the idea of a priori intuition, but it is already quite clear that for him sensible representation plays a crucial role in the demonstrative process of mathematics. It is not by chance that Kant speaks of the use of "figures" and other "visible signs" (AA 2:279) to express the general mathematical concepts *in concreto*.



*Revista de Estudios Kantianos* ISSN-e: 2445-0669
Vol. 8, Núm. 2 (2023): 432-451 https://www.doi.org/10.7203/REK.8.2.27512

mathematics proceeds in its deductions, following a syllogistic chain capable of reproducing the "connection between determinant and determinate that reigns in ontology" (GW, 2, 34.1, § 8). As we have seen in the previous sections, according to the Wolffian model, it is precisely the necessary character of this connection on which the certainty of mathematical proofs depends. On the contrary, the way in which Kant interprets mathematical definitions shows us that for him the certainty of this discipline is in no way traceable to the 'logic' of the rationalist ontology.[23] Indeed, although Kant agrees with Wolff about the centrality of the formal principles of identity and non-contradiction to the development of mathematical syllogisms,[24] for him they are not capable of *grounding* any kind of demonstration.

> For on their basis alone it really is not possible to prove anything at all (*kann wirklich gar nichts bewiesen werden*). Propositions are needed which contain the intermediate concept by means of which the logical relation of the other concepts to each other can be known in a syllogism. And among these propositions there must be some which are the first (AA 2:295).

According to Kant, at the basis of every deductive process are indeed 'indemonstrable propositions' [*unerweisliche Sätze*],[25] or rather propositions that do not require any demonstration. In mathematics, in particular, these propositions are such that, "even if they admit of proof elsewhere, they are nonetheless regarded as immediately certain (*gewiß*) in this science" (AA 2:281). These propositions, because of the synthetic nature of the mathematical processes, actually coincide with the "first indemonstrable concepts of the things defined" (AA 2:296). And these concepts are properly such for Kant because they are somewhat *a priori given* by their own definitions (*cf.* Lorini, 2016, pp. 123-124). In the case of philosophical knowledge, as we shall see, things are quite different.

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[23] In this respect, Paola Basso speaks of an "ostensive" certainty of the geometric proofs, which lies in the fact that in them one does not have to resort to an external "ground" (2004, pp. 61-63).

[24] Indeed, for Kant, mathematics shares with metaphysics the so-called "formal part" of judgment: "In both metaphysics and geometry, the formal element of judgments exists by virtue of the laws of agreement and contradiction" (AA 2:296).

[25] With the adjective *unerweislich*, Kant does not want to express an absolute indemonstrability, for which the term *unbeweislich* is used in his lectures (Lorini, 2016, p. 122). On the distinction between *unerweislich* and *unbeweislich*, *cf.* Koriako (1999, p. 33); Tonelli (1959, p. 208).



*Revista de Estudios Kantianos* ISSN-e: 2445-0669
Vol. 8, Núm. 2 (2023): 432-451 https://www.doi.org/10.7203/REK.8.2.27512

## 3. The philosophical method according to Kant

The element that best exemplifies Kant's critique of the Wolffian 'methodological monism' is undoubtedly that of definition. For Kant, in fact, the main difference between mathematics and philosophy is that for the former, the definition is the starting point of its demonstrations, whereas for the latter, it is "nearly always the last thing I come to know" (AA 2:283).[26] This is one of the main theses of the *Deutlichkeit*, which will remain essentially unchanged into the *Critique of pure reason* (A727-732/B755-760; see Caimi, 2012, pp. 5-16).

The reason why it is not possible to begin with definitions in the field of philosophical knowledge, and especially in metaphysics, is very clear for Kant: in metaphysics "one starts with what is the most difficult […] with possibility, with existence in general, with necessity and contingency, and so on" (AA 2:289), i.e. with the most complex and difficult to understand concepts due to their high level of abstraction (AA 2:279). The main mistake of the 'school philosophers' was to confuse the abstract concepts with which philosophy begins with simple concepts: according to Kant, this is the main reason why it was thought possible to proceed in metaphysics as in mathematics. Referring to those who advocate the Wolffian model of the '*mathematice philosophari*', Kant writes:

> Those who practice philosophy in this vein congratulate each other for having learnt the secret of thorough thought from the geometers. What they do not notice at all is the fact that geometers acquire their concepts by means of synthesis, whereas philosophers can only acquire their concepts by means of analysist – and that completely changes the method of thought (AA 2:289).[27]

A complete change in the "method of thought", i.e. the rejection of the Wolffian ideal of methodological monism (Malter, 1979, p. 586), is a necessary step to ensure the certainty of metaphysical knowledge. Because of the nature of the philosophical concepts, a very specific method is required,

[26] Kant also points out that what are commonly called philosophical definitions are often nothing more than determinations of a grammatical nature (AA 2:277).

[27] R. Malter argued that this change in the "method of thought" would be the first step towards that "revolution in the way of thinking" in the metaphysical sphere that would be definitively sanctioned with the *Critique of pure reason* (1979, p. 586).



*Revista de Estudios Kantianos* ISSN-e: 2445-0669
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in no way comparable to the axiomatic model of mathematics, which moves from simple concepts to more complex ones through a progressive chain of deductions. To envisage this change, Kant explicitly draws on the model introduced by Newton[28] in the natural sciences.

> Newton's method maintains that one ought, on the basis of certain experience […] to seek out the rules in accordance with which certain phenomena of nature occur […]. Likewise in metaphysics: by means of certain inner experience, that is to say, by means of an immediate and self-evident inner consciousness, seek out those characteristic marks which are certainly to be found in the concept of any general property. And even if you are not acquainted with the complete essence of the thing, you can still safely employ those characteristic marks to infer a great deal from them about the thing in question (AA 2:286).[29]

The epistemic model described by Kant establishes that in metaphysics one must begin by seeking what we are given to know in a *certain* and *immediate* way about the "abstract concept of an object" (AA 2:289), even though one can never have a complete knowledge of it. That is, even one can never have a cognition of it that fully satisfies the criteria of the definition. For Kant, in fact, the main tool of metaphysics is a kind of 'conceptual analysis' that does not aim at definition at all. It is an analytical process that actually consists in breaking down [*zergliedern*] already given concepts (AA 2:276) into their simplest elements. That means that, if the task of mathematics is to combine and compare concepts in order to see what can be deduced from them, that of philosophy is the opposite: its task is "to analyse concepts which are given in a confused fashion, and to render them complete (*ausführlich*) and determinate (*bestimmt*)" (AA 2:278).

In fact, in all philosophical disciplines, and especially in metaphysics, both the distinctiveness of cognitions and the possibility of drawing valid conclusions depend on this kind of analysis. But far from leading to the

[28] According to Kant, it was Newton who made it possible to organize physics in a systematic way, transforming the "chaos of its hypotheses into a secure procedure based on experience and geometry" (AA 2:275). And it is this that he takes as an example (*cf.* Lorini, 2016, p. 116; Martínez, 2018, p. 256). This does not mean that Kant affirmed the theses of the physicist, as the notes of physics lectures and texts published by Kant in the pre-critical period show (*cf.* Watkins, 2012, pp. 429-437).
[29] According to Tonelli, the experience to which Kant refers here would be similar to the "inner evidence" of which Crusius spoke (1955, p. 229). Cicatello, for his part, speaks of a conceptual experience *sui generis*, through which the notes of the concepts are immediately given to our conscience (2012, p. 85).



*Revista de Estudios Kantianos* ISSN-e: 2445-0669
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definition of general concepts, philosophical analysis inevitably leads us to *notiones* which, because of their simplicity[30] can no longer be analyzed.

> It is obvious from the start that the analysis will inevitably lead to concepts which are unanalysable. These unanalysable concepts (*unauflösliche Begriffe*) will be unanalysable either in and for themselves or relatively to us. It is further evident that there will be uncommonly many such unanalysable concepts, for it is impossible that universal cognition of such great complexity should be constructed from only a few fundamental concepts (AA 2:280).

Among these concepts, Kant includes those that are difficult to analyze–such as the concept of "representation", that of "being next to the other" and that of "being after the other"–and those that can only be partially analyzed, such as the concepts of space and time (AA 17:250; Refl. 3709). In both cases we are dealing with notions that are insoluble for us.[31] Such conceptual data would correspond to the content, i.e. the *material* of those "indemonstrable propositions" (Cicatello, 2012, p. 85) on which the philosophical analyses are based. Kant emphasizes their importance by arguing that the primary task of higher philosophy, i.e. ontology "consists in seeking out these indemonstrable fundamental truths" (AA 2:281). For Kant, this is a 'preliminary exercise'[32] whose importance in metaphysics has been completely underestimated by the rationalist philosophers.

In metaphysics, then, the same is true as in mathematics: in neither discipline is it possible to prove anything by reference to the *formal principles* of logic alone.[33] In both disciplines it is indeed necessary to appeal to indemonstrable propositions–which Kant also calls 'material principles'[34]–as

[30] These concepts seem to correspond to the "very simple concepts" of which Kant speaks in the *Nova Dilucidatio* (AA 1:390). See also *Logik Jäsche*, AA 9:59; *Logik Blomberg* AA 24: 109.

[31] This seems to be consistent with what is reported in Kant's lectures of these years. Indeed, *Herder Metaphysics* mentions a 'new plan' [*neue Plan*] for metaphysics in which the insoluble principles of ontology are appealed to by recourse to principles that are insoluble for us (AA 28:155-158). This proximity between the two works has been pointed out by Koriako (1999, p. 32).

[32] We must not forget that Kant does not deny *tout court* the possibility of proceeding by synthesis even in metaphysics. Rather, he is concerned with the idea that this synthetic procedure can only take place after a preliminary exercise of an analytic nature on the concepts (see AA 2:290).

[33] For Kant, this applies to both the theoretical and the practical spheres (see AA 2:299).

[34] According to what is reported in Kant's lectures, and also in some of his handwritten reflections, a material principle is that which contains an 'intermediate concept' [*Mittelbegriff*] by virtue of which it becomes possible to determine the union of a subject with a predicate which is not (analytically) contained in its concept (cf. *Met. Herder* AA 17:08; see also Refl. 3710, AA 27:251). Kant's printed



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the basis for their conclusions. But if in mathematics such propositions correspond to the definitions of the concepts, in metaphysics they must indicate the *primary data*, that is, those 'material elements' which present themselves in the form of an immediate and evident experience. For Kant, it is these that provide a secure *ontological basis* for metaphysical knowledge.[35]

> In both [metaphysics and geometry] indemonstrable propositions constitute the foundation on the basis of which conclusions are drawn. But whereas in mathematics the definitions are the first indemonstrable concepts of the things defined, in metaphysics the place of these definitions is taken by a series of indemonstrable propositions which provide the primary data. Their certainty may be just as great as that of the definitions of geometry. They are responsible for furnishing either the stuff, from which the definitions are formed, or the foundation, on the basis of which reliable conclusions are drawn (AA 2:296).

By virtue of this reference to the primary data, metaphysical propositions can attain a degree of certainty like that of geometrical definitions, but of a very different kind. In many cases,[36] metaphysical knowledge can indeed achieve a high degree of certainty in terms of 'conviction', but it cannot–and will never be–able to boast the demonstrative evidence that is proper to the mathematical proofs. In this respect, some authors have spoken of Kant's explicit rejection of the so-called 'myth of demonstrability' in philosophy (see Basso, 2004, pp. 190-191). A more than an emblematic case, in this sense, is offered to us in the *Beweisgrund* (1762). In this work, as is well known, Kant brings into play the analytic model proposed in the *Deutlichkeit* (*cf.* Cicatello, 2012, pp. 86-89) in order to provide not a demonstration, but rather a possible 'argument' in support of a demonstration of God's existence. After all, as Kant himself openly admits: "It is absolutely necessary that one should convince oneself that God exists",

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and lecture texts suggest that he included among these principles, for example, Crusius' principle of "*ubi et quando*" (AA 2:76; AA 17:09).

[35] In this regard, Cassirer wrote: "Only through this continuous relation to the "given" of inner and outer experience does the metaphysical concept receive its relative validity" ["Nur durch diese durchgängige Beziehung auf das „Gegebene" der inneren und äußeren Erfahrung erhält der metaphysische Begriff seine relative Gültigkeit"] (1921, p. 73).

[36] For example, within the framework of the *Deutlichkeit* Kant excludes that such a degree of certainty can be achieved in the moral sphere with the actual constitution of its principles (AA 2:298-299).



*Revista de Estudios Kantianos* ISSN-e: 2445-0669
Vol. 8, Núm. 2 (2023): 432-451 https://www.doi.org/10.7203/REK.8.2.27512

but "that His existence should be demonstrated […] is not so necessary" (AA 2:163).

## 4. Conclusions

Through this analysis, I have attempted to show that Kant's main polemical target within the *Deutlichkeit* is once again the formal principles of rationalist ontology. More specifically, I have tried to show that this is essentially what underlies Kant's critique of Wolffian mathematical method.

In the first part of this essay, I have indeed shown that the same Wolffian concept of 'mathematical method' actually refers to a universal model of inquiry that can be traced back to the logical principles of rationalist ontology. I then went on to analyze one of the key elements of this method: the definition. According to Wolff, in fact, every demonstrative process necessarily begins with the definitions. And it is against this idea that Kant openly rails in the *Deutlichkeit*. This analysis has shown us that for Wolff it is possible to acquire definitions both through the logical analysis of concepts and through their arbitrary determination.

Continuing our investigation, we have seen that Kant would have clearly distinguished between the 'synthetic' method of mathematics and the 'analytic' method of philosophical knowledge by separating and *reinterpreting* the Wolffian processes of conceptual analysis and arbitrary determination. By highlighting the salient aspects of these two processes in Kant, I have thus shown that, according to Kant, neither mathematical nor philosophical knowledge can be explained by the recourse to the 'formal principles' of rationalist ontology. In both cases, it is indeed necessary to appeal to indemonstrable propositions or material principles, whose different nature–synthetic for mathematics, analytic for philosophy–it is what determines a different kind of 'certainty' of their cognitions.

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Vol. 8, Núm. 2 (2023): 432-451 https://www.doi.org/10.7203/REK.8.2.27512

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Received: 14/08/2023

Accepted: 04/10/2023



ISSN-e: 2445-0669
https://www.doi.org/10.7203/REK.8.2.27512