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The Concept of Space and Extension in Leibniz's Philosophy

Preliminary Remarks: Objectives and Research Context

The purpose of this article is to explore how Leibniz integrates the concepts of space and extension with the dynamics of forces operating within the phenomenal world. The analysis begins with an examination of Leibniz's relational conception of space, contrasted with Newton's theory of absolute space. It then investigates space as a continuous magnitude and extension as the phenomenal expression of relational structures among material bodies. Finally, the discussion culminates in an exploration of the interplay between space, extension, and matter within Leibniz's metaphysical framework, emphasizing the pivotal role of primary forces—both active and passive—in shaping the dynamic organization of the phenomenal world. This framework underscores Leibniz's vision of reality as fundamentally grounded in the interaction of forces, which constitute the ontological foundation for both material phenomena and their spatial order.

Leibniz's conception of space and extension has been a focal point of scholarly inquiry, with researchers analyzing both his relational view of space and the phenomenal character of extension. Foundational studies, such as Richard Arthur's *Leibniz and the Philosophy of Space, Time, and Relativity*[1] examine the philosophical underpinnings of Leibniz's critique of Newtonian absolute space, emphasizing his relational understanding of spatial order. Similarly, works like *Leibniz: Body, Substance, Monad*[2] by Daniel Garber and Donald Rutherford's influential article *Phenomenalism and the Reality of Body in Leibniz's Later Philosophy*[3], investigate the complex interplay between space, matter, and the dynamic forces shaping the phenomenal world. Together, these works highlight the foundational metaphysical questions driving Leibniz's engagement with physical reality. Building on these discussions, Ohad Nachtomy's recent study *Living Mirrors*[4] offers a nuanced exploration of the relationship between continuity, infinity, and metaphysical structure in Leibniz's philosophy. In a historical vein, Christia Mercer's *Leibniz's Metaphysics: Its Origins and Development*[5] situates his ideas within the broader intellectual landscape, focusing on his dialogues with Newton and Descartes. More recently, Jeffrey McDonough's *Leibniz and the Foundations of Physics: The Later Years*[6] underscores the pivotal role of dynamic forces in bridging Leibniz's metaphysical system with his account of physical phenomena, such as space and extension. His analysis offers valuable insights into how Leibniz reconciled the non-extended nature of monads with the extended nature of material bodies in the phenomenal world, shedding new light on the coherence of Leibniz's philosophy.

Collectively, these studies demonstrate how Leibniz integrated the concepts of space and extension with relationality and the metaphysical principles underlying reality, establishing his theory as a cornerstone of early modern

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[1] Richard Arthur, *Leibniz on Space, Time, and Relativity* (Oxford: Oxford University Press, 2021).

[2] Daniel Garber, *Leibniz: Body, Substance, Monad* (Oxford: Oxford University Press, 2009).

[3] Donald Rutherford, „Phenomenalism and the Reality of Body in Leibniz's Later Philosophy", Studia Leibnitiana 22 (1990): 11-28.

[4] Ohad Nachtomy, *Living Mirrors: Infinity, Unity, and Life in Leibniz's Philosophy* (Oxford: Oxford University Press, 2019).

[5] Christia Mercer, *Leibniz's Metaphysics: Its Origins and Development* (Oxford: Oxford University Press, 2004).

[6] Jeffrey McDonough, „Leibniz and the Foundations of Physics: The Later Years", The Philosophical Review (2016) 125 (1): 1–34.

philosophy. Building on this foundation, the foregoing analysis draws directly on Leibniz's primary texts, engaging closely with his metaphysical framework and the nuances present in his writings. While this article acknowledges the contributions of foundational studies and the broader scholarly discourse, it prioritizes a close reading of Leibniz's works. By adopting this approach, the analysis aims to shed light on lesser-explored dimensions of his metaphysical framework and its implications for the relational nature of space and extension, particularly in connection with his theory of forces and dynamics.

1. Space, Extension, and Relational Ontology

The ontological status of space has been a topic of debate since antiquity, with Democritus envisioning space as a void facilitating atomic motion. In modern philosophy, this concept evolved through the works of Galileo, Descartes, and Locke, who distinguished primary qualities (extension, shape, motion) from secondary qualities (color, taste, smell). Galileo highlighted the mathematical nature of space, treating it as the foundation for the scientific explanation of the physical world. Descartes, on the other hand, identified space with the essence of matter, while Locke contended that our idea of space emerges from sensory experience rather than innate concepts. These distinctions framed the central question: Does space exist as an independent entity, or is it a relational order among things? The resolution of this question set the stage for Newton's theory of absolute space and Leibniz's opposing relational conception.

Newton's theory, articulated in his *Principia Mathematica*, proposed that absolute space exists independently of material bodies, serving as a universal and unchanging framework in which all phenomena occur (Definition VIII, Scholium).[7] He contrasted this with relative space, which he described as a practical construct for measuring and describing motion in relation to objects. Newton characterized absolute space as immovable and eternal, stating: "We can clearly conceive extension existing without any subject, as when we imagine spaces outside the world or places empty of body."[8] For Newton, such a

[7] Isaac Newton, *Mathematical Principles of Natural Philosophy*, transl. Andrew Motte (Berkeley: University of California Press, 1962), 6-7.

[8] Isaac Newton, *Unpublished Scientific Papers of Isaac Newton*, ed. and trans. Alfred R. Hall, Marie Boas Hall (Cambridge: Cambridge University Press, 1962), 104. This

framework bore a resemblance to a substance, existing autonomously from the material world and persisting even in the absence of objects.

Leibniz strongly opposed this view, arguing that space is not an independent entity but a relational order of coexistence among things. He maintained that if all bodies were to vanish, space would cease to exist, as it arises solely from the relationships among objects. For Leibniz, the notion of absolute space was incompatible with his Principle of the Identity of Indiscernibles (*principium identitatis indiscernibilium*), which holds that no two distinct entities can be identical in all respects. In *The Primary Truths*, he wrote: "There is no vacuum. For the different parts of empty space would be perfectly similar and congruent with each other and could not by themselves be distinguished. So they would differ in number alone, which is absurd."[9]

Similarly, in his correspondence with Clarke, Leibniz argued: „To suppose two things indiscernible is to suppose the same thing under two names (…) The same reason which shows that extramundane space is imaginary proves that all empty space is an imaginary thing" (*Letters to Clarke*, Letter IV, §5-6)[10].

Leibniz's relational conception of space circumvented the paradoxes inherent in the idea of empty space and absolute structures. He characterized space as: "purely relative, as time is; it is an order of coexistences, as time is an order of successions." (*Letters to Clarke*, Letter III, §4)[11]. Space, in his view, was not a self-subsistent reality but an intellectual abstraction—a framework constructed to represent the phenomenal relationships among objects. These relationships, which he referred to as "well-founded phenomena" (*phaenomena bene fundata*), are phenomenal and ideal, yet rooted in the objective structure of relations among monads. This perspective aligns with his broader metaphysical framework, in which space functions as a representation of the harmonious interplay between monads and their phenomena.

One of the central categories in early modern debates about the nature of space was the concept of extension (*extensio*), which held particular significance in the philosophy of Descartes. Descartes equated extension with the essence of

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quotation is taken from Michael J. Futch, *Leibniz's Metaphysics of Time and Space* (Dordrecht: Springer Netherlands, 2008), 42.

[9] Gottfried Wilhelm Leibniz, „The Primary Truths", in: *Philosophical Papers and Letters*, ed. and transl. Leroy E. Loemker (Dordrecht: Kluwer Academic Publishers, 1989), 269.

[10] Gottfried Wilhelm Leibniz, *G. W. Leibniz and Samuel Clarke Correspondence*, ed. Roger Ariew (Indianapolis: Hackett Publishing Company, Inc., 2000), 22-23.

[11] Ibidem, 14.

matter, asserting that space and matter are inseparable. He famously wrote: "There is no real distinction between space (…) and the corporeal substance in it; the only difference lies in the way in which we are accustomed to conceive of them. For in reality the extension in length, breadth and depth which constitutes a space is exactly the same as that which constitutes a body."[12] For Descartes, a vacuum was impossible; space was always filled with substance. Consequently, he equated the material world with a geometric model, which became the foundation of his mechanistic approach to nature.

Leibniz, however, rejected this conflation of space and matter, contending that extension is not an intrinsic property of matter but rather a phenomenal expression of spatial relations among material bodies. According to Leibniz, extension arises from the interaction of monadic forces, more precisely, derived forces (*vires derivativae*), which are momentary modifications of the primary active force (*vis activa primitiva*)—representing the monad's internal dynamism—and the primary passive force (*vis passiva primitiva*), which accounts for resistance and inertia. Together, these foundational elements form the foundation of every monad, shaping its capacity for action and receptivity.

Within this framework, extension is understood as the phenomenal manifestation of monadic forces, representing how spatial relations are perceived in the phenomenal world. Extension does not exist independently of space; rather, it is a characteristic of perceived bodies, rooted in their relational order. This notion of *extensio* sharply contrasts with Descartes' mechanistic identification of space with matter and Newton's vision of absolute space as a self-subsistent framework. Leibniz's reinterpretation emphasizes extension as a relational phenomenon, arising from the dynamic interplay of forces rather than existing as an independent property or geometric abstraction.

In summary, Leibniz's philosophy presents space as an ideal and abstract relational order, distinct from extension, which serves as the sensory mode of perceiving these relations. While both concepts are phenomenal, they differ in scope: space refers to the general order of coexistence among things, whereas extension represents the specific way this order is realized in sensory experience. This relational view of space is integral to Leibniz's metaphysical system, where monads and their forces form the foundation of reality. By anchoring relational space within this dynamic framework, Leibniz reconciled the infinite divisibility

[12] René Descartes, „Principles of Philosophy", in: *The Philosophical Writings of Descartes*, vol. 4, transl. John Cottingham, Robert Stoothoff, Dugald Murdoch (Cambridge: Cambridge University Press, 1985), 227.

of reality with its harmonious structure, offering a groundbreaking perspective on the nature of space, extension, and matter.

2. The Ideal Nature of Space as a Continuous Magnitude

For Leibniz, space, like time, is a continuous magnitude with an ideal nature. In a letter to Des Bosses, he explains: "space, like time, is a certain order, namely (in the case of space) that of coexisting, which includes not only actual things but also possibles. It follows that it is something indefinite, like every continuum whose parts are not actual but can be taken at will: (…) space is something continuous, but ideal, whereas mass is discrete, indeed an actual multitude".[13]

This statement underscores Leibniz's distinction between the continuous, ideal nature of space and the discrete, actual composition of material entities. Space, as a conceptual continuum, exists only as an abstract framework for organizing relations among entities, reflecting not physical reality but the potential arrangements of coexistence.

Leibniz juxtaposes the continuum of space with the discrete nature of monads and their aggregates, which are real and determined through a specific form of division. Monads, being simple substances, lack extension and therefore cannot form part of any continuous entity in the physical sense. Their nature is fundamentally different from spatial or temporal continuity, as they are indivisible metaphysical points: "The monad which we are to discuss here is nothing but a simple substance (…). Simple means without parts." (*Monadology*, §1) [14].

In contrast, space exists as a conceptual continuum where monads or their aggregates are represented as coexisting entities. Consequently, the continuity of space is not substantial in nature but remains an ideal construct designed to describe the relationships between real entities.

Leibniz distinctly separates the nature of monads from that of space, emphasizing that: "Monads have no windows through which anything could

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[13] Wilhelm Gottrfried Leibniz, *The Leibniz-Des Bosses Correspondence*, transl. Brandon C. Look, Donald Rutherford, New Haven and London: Yale University Press, 2007), 141

[14] Wilhelm Gottrfried Leibniz, "The Monadology", in: *Philosophical Papers and Letters*, ed. and transl. Leroy E. Loemker (Dordrecht: Kluwer Academic Publishers, 1989), 643.

enter or depart (…) since an external cause could not influence their interior." External causes - he adds – „affect only their phenomenal aggregates" (*Monadology*, §7, 11)[15]. Although monads exist in infinite numbers, this does not imply continuity in the geometric sense. They are not spatial points and, therefore, cannot be connected in a manner consistent with physical or mathematical continuity. Instead, their infinity manifests in harmony and order, which are phenomenally expressed as space and extension.

To fully grasp this distinction, it is necessary to elaborate on two types of division: determinate and indeterminate[16]:

1. Determinate division pertains to the monadic reality, in which each monad is an independent, precisely defined substance, while still interacting with others in a pre-established harmony. On this fundamental level, reality is discontinuous, composed of non-extended and indivisible units of existence.
2. Indeterminate division, on the other hand, applies to ideal continua such as space or time. In these continua, each part can be infinitely divided without ever reaching a final boundary—division remains potential and infinite. As Leibniz's philosophy suggests, indeterminacy is the essence of continuity, highlighting that continua are not composed of discrete, determinate parts but represent an abstract framework for potential division. This kind of division is characterized by the fact that each part of the continuum remains ideal rather than actual.

The apparent tension between the continuity of space and the discreteness of monads is resolved in Leibniz's philosophy through his theory of relations and perception. Monads, while metaphysical points lacking extension, create a phenomenal order that manifests as the continuity of space and time. Space and time are thus ideal forms, organizing phenomena within the realm of perception rather than constituting elements of substantial reality. The phenomenal continuity of space arises from the harmony of monads, which, although they do not interact directly, remain in perfect accord due to the pre-established harmony instituted by God.

Leibniz also highlighted the dual nature of the spatial continuum, noting that it encompasses both possibilities and actualities—but actualities only insofar as

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[15] Ibidem, 643, 644.

[16] "Wilhelm Gottrfried Leibniz Letter an de Volder" (January 19, 1706), in: *Philosophical Papers and Letters*, ed. and transl. Leroy E. Loemker (Dordrecht: Kluwer Academic Publishers, 1989), 539.

they are regarded as possibilities. Space, therefore, is an ideal order expressing potential relations among parts. In a 1706 letter to De Volder, Leibniz writes: "But a continuous quantity is something ideal which pertains to possibles and to actualities only insofar as they are possible. A continuum, that is, involves indeterminate parts, while on the other hand, there is nothing indefinite in actual things, in which every division is made that can be made"[17].

A continuum, according to Leibniz, is not a collection of finite and discrete parts but rather an infinite system of relations that, by its very nature, can never be fully divided or actualized. For Leibniz, space exemplifies such an ideal continuum. It serves not only as a framework for describing relations between entities but also as a conceptual tool for exploring the infinite range of possible configurations of those relations. From this perspective, Leibniz equates the continuum with a "realm of possibilities," emphasizing that its indeterminacy is not a limitation but a fundamental characteristic. This indeterminacy reflects the potentiality inherent in the ideal order of relational structures.

3. Geometrical Extension

A central concept in early modern debates on the divisibility of matter and the nature of space was the notion of extension (*extensio*). Leibniz critically engaged with the prevailing views of his time, particularly those of Descartes and Newton. As discussed earlier, Descartes did not view space as an independent entity but as inextricably tied to matter. In his philosophy, space and matter were identical: space was merely a property of matter, characterized by its three-dimensional extension. Descartes rejected the existence of a vacuum—empty space devoid of matter—insisting that all space must necessarily be filled with substance. His view denied both absolute space, as proposed by Newton, and relational space, as developed by Leibniz.

Furthermore, Descartes regarded the infinite divisibility of matter into ever smaller parts as proof of its continuous and geometric nature. From this perspective, he concluded that the material world could be fully comprehended within a mathematical framework, thereby establishing the foundation for modern natural science. Leibniz, however, rejects this materialistic reductionism,

[17] Wilhelm Gottrfried Leibniz, *Philosophical Papers and Letters*, ed. and transl. Leroy E. Loemker (Dordrecht: Kluwer Academic Publishers, 1989), 539.

arguing that extension is merely an attribute of substance, whose true essence lies in the notion of force. Extension is neither primitive nor simple; it is derivative and relative, as it can be analyzed into more fundamental components: continuity and the coexistence of parts.

Just as, according to Leibniz, numbers depend on what is being counted, extension must derive from something deeper that grounds its existence. The true basis of *res extensa* lies in the primitive active and passive forces. By failing to acknowledge the dynamic aspect of matter, Descartes, according to Leibniz, cannot grasp its true nature. Extension, when reduced to a purely mathematical definition, loses its ontological foundation and becomes merely a geometric model, disconnected from the real nature of matter.

While Leibniz recognizes that mathematics reveals eternal truths, he also underscores its dependence on perception: „It can even be demonstrated that the concepts of size, figure, and motion are not so distinct as has been imagined and that they include something imaginary and relative to our perceptions"[18].

A purely geometric understanding of extension, while assuming infinite divisibility, falls short of fully capturing the nature of matter. Although it offers a valuable heuristic model for calculating physical parameters, it lacks an ontological foundation. In one of his final letters to De Volder, Leibniz explains: „In mathematical extension, which serves us merely as a ground for possible concepts, there is no actual division; that is, there are no parts other than those we establish in thought. Likewise, there are no primitive elements here, just as in the case of fractions there is no smallest fraction that could constitute an element of the others. Thus, number, hour, line, as well as motions or velocities and other similar ideal magnitudes or mathematical entities, are not, in fact, aggregates composed of parts, for the manner of division into parts remains entirely indeterminate. This arises from the fact that they signify nothing other than the possibility of division into parts in any conceivable way" (*Letter to De Volder*, 1705)[19].

This passage highlights the distinction between the mathematical ideal of infinite divisibility and the ontological reality of matter, which Leibniz rooted in his metaphysical framework. Extended matter, when treated as a mathematical continuum, represents an abstract totality that can, in theory, be divided

[18] Wilhelm Gottrfried Leibniz, „Discourse on Metaphysics", in: Wilhelm Gottrfried Leibniz, *Philosophical Papers and Letters*, ed. and transl. Leroy E. Loemker (Dordrecht: Kluwer Academic Publishers, 1989), 309.

[19] Wilhelm Gottfried Leibniz, *Hauptschriften zur Grundlegung der Philosophie*, transl. Artur Buchenau, vol. 2 (Felix Meiner Verlag: Hamburg, 1996), 527-528.

infinitely into arbitrarily small parts. However, a continuum without defined parts, incapable of being divided into fundamental elements, cannot be regarded as truly real.

In Leibniz's view, the ontological foundation of matter differs fundamentally from that of a spatial continuum. While spatial division produces parts that can be endlessly subdivided, this process does not yield what Leibniz calls "true unities"—monads or primitive active forces, which he identifies as the "primitive elements" of existence. This distinction underscores that the true basis of matter cannot be subjected to arbitrary division in the same way as a mathematical abstraction, which exists only as a construct of thought. Instead, the underlying structure of matter is grounded in the indivisible and fundamental nature of monads. Although spatial division may be conceptually infinite, it does not reach the true metaphysical elements that constitute reality.

A purely mathematical definition of extension fails to establish its existence. As a continuum characterized by simultaneity, *extensio* possesses the quality of infinite divisibility, which inherently lacks the principle of unity essential to the concept of substance. The reality of spatially extended matter can only be affirmed if it contains something inherently non-extended—something that grounds its existence and provides its ultimate justification: "there is something besides extension in corporeal things; indeed, that there is something prior to extension, namely, a natural force everywhere implanted by the Author of nature"[20]. Leibniz anchors *res extensa* in a non-extended principle, resolving the dualism of matter and spirit (extended body and non-extended monad) and uniting both aspects of reality within a fundamental unity rooted in primary forces.

The question of the nature of extension in the physical world ultimately concerns the relationship between mathematics (geometry) and the primary forces that underpin physical bodies. Leibniz emphasizes that while it is essential to distinguish actual extension from its mathematical representation, the cognitive value of this representation should not be underestimated. It plays a crucial role in the mechanistic framework of physics, which successfully describes the phenomenal world. Bodies can only be regarded as extended substances insofar as geometry approximates their true nature. Ultimately, however, in a metaphysical sense, what truly exists are the primary forces.

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[20] Wilhelm Gottfried Leibniz, „Specimen Dynamicum", in: Wilhelm Gottrfried Leibniz, *Philosophical Papers and Letters*, ed. and transl. Leroy E. Loemker (Dordrecht: Kluwer Academic Publishers, 1989), 435.

4. The Extension of Secondary Matter in the Context of the Theory of Forces

Phenomenal extension results from the activity of derivative forces, which are themselves modifications of primary forces. In *Specimen Dynamicum*, Leibniz briefly defines extension as follows: "extension means only the continuation or diffusion of an already presupposed acting and resisting substance. So far is extension itself from comprising substance!"[21]. While concise, this definition highlights the interaction of primary forces, which, at the phenomenal level, are expressed as continuity and diffusion within the framework of monadic perception.

To deepen our understanding of this concept, Leibniz provides a more comprehensive explanation in his letter to Burchard de Volder, dated January 30, 1704. The following excerpt, due to its centrality in elucidating Leibniz's relational and dynamic account of extension, is quoted in full: "(...) extension is an abstraction from the extended and can no more be considered substance than can numer or a multitude, for it expresses nothing but a certain nonsuccessive (i.e., unlike duration) but simultaneous diffusion or repetition of some particular nature, or what amounts to the same thing, a multitude of things of this same nature which exist together with some order between them; and it is this nature, I say, which is said to be extended or diffused. The notion of extension is thus relative, or extension is the extension of something, just as we say that a multitude or a duration is a multitude, or a duration, of something. But this nature which is said to be diffused, repeated, and continued is that which constitutes a physical body, and it can be found in no other principle but that of acting and enduring, since no other principle is suggested to us by the phenomena"[22].

This passage highlights Leibniz's understanding of extension as a secondary phenomenon—not inherent to matter itself, but emerging from the dynamic interplay of forces that constitute physical bodies. As Leibniz argues, extension does not exist independently but is always the extension of something. It represents a simultaneous diffusion or repetition of a specific nature within an ordered relationship. By grounding extension in the dynamic interaction of

[21] Ibidem.

[22] Wilhelm Gottrfried Leibniz, *Philosophical Papers and Letters*, ed. and transl. Leroy E. Loemker (Dordrecht: Kluwer Academic Publishers, 1989), 536.

forces, Leibniz underscores its relative and derivative character, rejecting any notion of it as a self-sufficient entity. This perspective situates extension within the broader metaphysical framework of his philosophy, rooted in the dynamic essence of corporeal substances.

In this context, extension is understood as a property of "extending" or the repetition of a particular essence, which Leibniz associates with monadic substance, composed of primary active and passive forces. Just as a number serves as an abstract expression of multiplicity (*multiplicitas*), extension, on the phenomenal level, signifies the ordered multiplicity of monadic substances and the specific arrangement of relations between them. In his essay *On Body and Force, Against the Cartesians*, Leibniz cautions against equating "repetition" with the repetition of discrete parts, as occurs in sensory physical substances. For example, milk is an aggregate of various components—fat molecules, proteins, and water—each of which can be divided further into smaller parts. Such structures lack true continuity; thus, the divisibility of physical mixtures exemplifies discrete repetition. Genuine continuous extension, by contrast, can only be found in the resistance and impenetrability of bodies, deriving from their primary matter: „Consequently it is only the extension of resistance, diffused through body, that retains this designation on a strict examination”[23].

Extension is not an attribute of monadic substance but rather a specific property of our sensory experience. Its most significant manifestation lies in resistance and the resulting impenetrability—qualities linked to the primary matter of physical bodies. It is resistance that ensures physical objects extend in space in a homogeneous and uninterrupted manner, forming cohesive, self-identical entities that distinguish themselves from their surroundings. This impenetrability—not any other physical property—grants a body its durability and its capacity to interact sensorily with other bodies. Consequently, a sensory object appears to us as an extended entity, even though its "physicality" is phenomenal and fundamentally rests on a monadic substratum, which itself is non-extended.

To fully understand Leibniz’s concept of extension, it is essential to recognize that extension is neither a mere collection of material parts nor a simple aggregation of individual resistances. Rather, it signifies the uniform presence of passive force diffused throughout matter. This foundational passive force is

[23] Wilhelm Gottfried Leibniz, „On Body and Force, Against the Cartesians”, in: Wilhelm Gottfried Leibniz, *Philosophical Essays*, trsl. and eds Roger Ariew, David Garber (Indianapolis: Hackett, 1989), 251.

shaped and sustained by active force (the substantial form), which imbues secondary matter with dynamic properties. Existing matter is not simply a homogeneous diffusion of resistance. Instead, this resistance, originating from primary matter or primitive passive force, achieves definition only through the forms that divide its uniform extension into distinct parts. As Leibniz explains in *On Body and Force*: "(…) since on our view there is something besides matter in body, one might ask what its nature is. Therefore, we
say that it can consist in nothing but the *dynamicon*, or the innate principle of change and persistence"[24]

Leibniz thus argues that the essence of a body resides not merely in its passive matter, expressed as the homogeneous diffusion of resistance, but also in its primary active force, which grants it the capacity for self-initiated change. The passive force ensures the continuity of secondary matter by eliminating gaps or voids, while its differentiation into distinct parts is driven by the action of primary active forces. Through this dynamic interplay, *materia secunda* takes on various forms and undergoes continuous division. The infinite variety of forms allows for endless divisions between any two parts, as each form is perpetually defined in relation to others..

Leibniz elucidates this paradoxical divisibility of continuous matter in a letter to De Volder, where he states: "[…] Matter—considered in itself, that is, insofar as it is merely passive—possesses the same nature everywhere. […] True substance is not found in the aggregated whole, but rather in its individual elements, just as the ocean does not constitute a single substance or a single thing, but each drop in turn contains other things, even if one assumes that all the drops consist of a uniform mass. Furthermore, water, before it takes the form of drops, and the mass of ivory, of which you mention, before it takes the form of statues, are in fact composed of parts, and the same applies to any actual mass. Even though, in mathematical extension, which serves us merely as the foundation for possible concepts, no actual division exists —there are no parts other than those we posit in thought" (Letter to De Volder, 1705) [25].

This passage highlights Leibniz's perspective that matter, when conceived as a purely passive element, possesses a fundamentally uniform nature throughout. However, its differentiation and individuality emerge from the active forces within, which organize and structure matter into distinct and substantial forms.

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[24] Ibidem, 256.

[25] Wilhelm Gottfried Leibniz, *Hauptschriften zur Grundlegung der Philosophie*, 527.

For Leibniz, the passive nature of matter allows it to maintain a uniform character across all instances, but it is the presence of active internal forces that generates true diversity. While the mass of a phenomenal body might appear to be infinitely divisible in mathematical terms, from a metaphysical standpoint, it is grounded in an actual, indivisible mass (*mole*) that undergoes real division. At the core of Leibniz's ontology are force-bearing substances—entities that serve as the foundational components of reality. These substances are not equivalent to aggregates, such as an ocean or a statue composed of multiple parts; instead, they are individual, internally defined unities, each containing within itself an active principle of existence distinct from the passive nature of matter.

The example of the ocean provides a clear illustration of this distinction: the combined mass of water drops does not, in itself, constitute a substance. Rather, each individual drop represents an independent substance, possessing its own internal unity and active principle, even as it contributes to the formation of a larger whole. This contrast reinforces Leibniz's broader metaphysical assertion that true substances cannot be reduced to passive aggregates but are instead defined by their internal, self-sustaining activity.

Secondary matter, by contrast, pertains to the way phenomena arising from the activity of monads are experienced within the phenomenal world. In other words, it reflects how the relationships between monads manifest in sensory perception as spatial and material entities. Space, understood as the order of coexistence among things, presupposes the existence of these relationally interconnected phenomena, which Leibniz identifies as secondary matter. Without this phenomenal manifestation of monadic relations, the concept of space would lack any meaningful content. As an ideal construct, space derives its significance only when it is grounded in sensory expression within the phenomenal realm.

Non-extended monads act through their intrinsic active and passive forces hat shape material bodies and their spatial arrangement. Secondary matter arises from the harmonious activity of monads, manifesting their relations within the phenomenal world as sensory phenomena. Space, as an ideal order, depends on material bodies to ground its relational structure. Material bodies are perceived as aggregates of monads, expressing their presence in the world through phenomenal extension. Space organizes these relations in accordance with the pre-established harmony, enabling the orderly coexistence of all phenomena.

Concluding Reflections

Wilhelm Leibniz's philosophy of space and extension marked a groundbreaking shift in early modern debates about the nature of reality. In contrast to Newton, who regarded space as an absolute framework with substantial characteristics, Leibniz conceptualized it as a relational order of coexistence. Rather than existing independently of material things, space arises from the relations among bodies, which the intellect organizes to structure the phenomenal world.

Simultaneously, Leibniz rejected Descartes' conflation of space with matter. While extension may appear as an intrinsic property of material bodies, it is, in Leibniz's view, neither a substance nor its essence but rather a phenomenal expression of the dynamic activity of monads. Central to this framework is the concept of forces—both active and passive—which provide the metaphysical foundation for space and matter alike.

Leibniz's conception of space and extension weaves together three key themes:

1. The Relational Nature of Space – Space does not exist independently but as an abstract order of relations among things.
2. The Phenomenality of Extension – Extension is not an inherent property of substances (monads) but a phenomenal mode through which perception organizes the relations between aggregates of monads.
3. The Dynamic Foundation of Reality – Forces, rather than geometry, constitute the foundation of matter and space. The mathematical continuum serves merely as a model for describing phenomena, not as a representation of reality itself.

Space, as an ideal continuum, embodies the infinite potentiality of relations and functions as a "pure phenomenon," enabling the organization of the phenomenal world. Its nature fundamentally differs from the substantial reality of monads, which remain non-extended, simple units of existence.

Leibniz transcended both Descartes' mechanistic reductionism and Newton's substantivalism by embedding his conception of space within the metaphysical framework of monads and pre-established harmony. In doing so, he articulated a vision of reality where the phenomena of space and extension are intrinsically linked to dynamics and relationality, while retaining their ideal and

mathematical character. A hallmark of Leibniz's philosophy was his ability to unify space, extension, matter, and forces into a coherent metaphysical system.

The influence of Leibniz's exploration of space and extension extends far beyond his own era, shaping the evolution of both philosophy and science. His ideas resonate in Kant's analysis of space as an a priori form of intuition, as well as in modern physics. The theory of relativity, for instance, moved away from the absolutism of space and time, adopting instead a relational ontology that echoes Leibniz's insights. His conception of space as a relational order among bodies anticipates foundational ideas in contemporary physics, including field theories and Einstein's space-time continuum.

Leibniz's work offers a profound perspective: while reality is perceived through sensory experience, its underlying structure is rooted in foundational elements, such as forces and relational dynamics. In this framework, space, time, and secondary matter emerge as phenomenal expressions of the dynamic harmony orchestrated by monads. As the primary building blocks of reality, monads serve as the ultimate coordinators of phenomena, aligning the perceptual world with the metaphysical principles of coherence and order that form the core of Leibniz's philosophical vision.

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Summary

This article examines Leibniz's conception of space and extension, emphasizing their ideal nature and integration with his dynamic theory of matter. Space, extension, and secondary matter are interpreted as phenomenal manifestations of monadic activity –

non-extended, simple metaphysical substances that structure phenomena through their internal active and passive forces. Space is characterized as an ideal relational order that facilitates the phenomenal appearance of material bodies as aggregates of monads. The extension of secondary matter, in turn, represents how these relational structures are made accessible to sensory perception.

Keywords: Leibniz, space, extension, matter, force, infinite division, continuity