International Journal of Science and Research Archive
eISSN: 2582-8185
Cross Ref DOI: 10.30574/ijsra
Journal homepage: https://ijsra.net/

(REVIEW ARTICLE)

Check for updates

Mathematical Singularities and Cosmological Horizons: An Integrated Onto-Epistemological Model at the Interface of Wisdom, Science and Cosmic Evolution

Nasip DEMİRKUŞ *

Department of Biology, Faculty of Education, Van Yüzüncü Yıl University, Tuşba, Van, Turkey.

International Journal of Science and Research Archive, 2025, 17(03), 242-253

Publication history: Received on 01 November 2025; revised on 06 December 2025; accepted on 09 December 2025

Article DOI: https://doi.org/10.30574/ijsra.2025.17.3.3234

Abstract

This comprehensive research reconstructs and deepens the "Wisdom-Science-Mathematics" tripartite framework developed by Prof. Dr. Nasip Demirkuş within the context of modern physical cosmology, the philosophy of mathematics, and theological epistemology.

The study argues that expressions traditionally classified in mathematical analysis as "undefined" ($a/0$, $\ln(0)$, $\sqrt{-a}$) and "indeterminate" ($0/0$, 1^{∞}, ∞/∞) are not merely abstract numerical anomalies or calculation errors.

On the contrary, it proposes that these expressions are precise **"structural metaphors"** that map the fundamental phases of the universe—such as the Big Bang Singularity, Cosmic Inflation, and the Big Rip—as well as the ontic boundaries of existence (Demirkuş & Bilgin, 2018b).

The research undertakes a terminological transformation:

- The concept previously referred to as "Creature" is redefined as **"Physical Entity"**;
- The concept of "Evolutionary Science" is redefined as **"Cosmic Evolution"**, extending beyond biological limits to encompass all material change from subatomic particles to galactic superclusters (Demirkuş, 2023).

Epistemological and Ontological Grounding: What is Wisdom (İlim)?

The concept of "Wisdom" (İlim), which forms the foundation of the model, is defined in the study as a two-layered structure:

- **Epistemological Dimension (Knowledge):** Absolute knowledge that is independent of time and space, eternal and everlasting (*Ilm-i İlahi* / Divine Knowledge).
- **Ontological Dimension (Potential Being):** The realm of absolute possibility (*Sübut Alemi* / Realm of Subsistence) which has not yet taken the form of physical energy and matter but carries the potential to exist.

In this context, Wisdom corresponds to the principle of **"Necessary Being"** (*Wajib al-Wujud*) in Islamic philosophy; whereas Science corresponds to the realm of **"Possible Being"** (*Mumkin al-Wujud*), where this potential manifests through physical laws (Ibn Sina, 2005).

Keywords: Mathematical Indeterminacies; Cosmological Singularity; Big Bang; Cosmic Inflation (Inflation Theory); Distinction between Wisdom and Science; Cosmic Evolution; Infinity and Eternity; The First Point; Topological Analysis; Ontology; Epistemology

* Corresponding author: Nasip DEMİRKUŞ

1. Introduction: Understanding the Universe at the Boundary of Two Cultures

1.1. Historical Background and the Cosmological Turn

Throughout the history of human thought, the problem of "origin" (*arche*) and "end" (*eschaton/telos*) has been the greatest problematic for both rational intellect (science and mathematics) and intuitive or faith-based intellect (philosophy and theology).

Until the 19th and early 20th centuries, the positivist scientific approach and metaphysical/theological approaches were perceived as parallel lines (*non-overlapping magisteria*) that might touch tangentially but never intersected in method or language.

- The positivist approach limited itself solely to the measurable, observable, and experimental;
- Concepts such as "being," "nothingness," and the "first cause" were abandoned to the realm of speculative metaphysics (Demirkuş, 2016).

From Ancient Greece to Medieval Islamic and Christian scholasticism, the problem of the universe's origin was addressed within a physical and metaphysical unity (Al-Ghazali, 1997). However, these boundaries became blurred when modern cosmology discovered that the universe is not static and infinite, but dynamic, expanding, and possessing a starting point designated as $t = 0$ (Wald, 1992).

When physicists look at the Cosmic Microwave Background (CMB) radiation—the universe's "baby picture"—or attempt to model the center of a black hole, they are essentially looking at the limits of mathematics: regions where functions become "undefined" (Bennett et al., 2013).

1.2. The Ontological Status of Mathematical Indeterminacies

At this juncture, mathematical "boundary conditions" (undefinedness and indeterminacies), viewed in traditional scientific frameworks as calculation errors or theoretical deficiencies, become not merely numerical obstacles but keys bearing the codes of existence.

The singularity theorems of Stephen Hawking and Roger Penrose proved that the equations of General Relativity predict a singularity where spacetime curvature goes to infinity under certain conditions (e.g., the beginning of the universe) (Hawking & Penrose, 1970).

This study argues that expressions encountered in mathematical analysis such as "division by zero" ($a/0$), "roots of negative numbers" ($\sqrt{-a}$), and "limits involving infinity" (1^{∞}) are not direct proofs of physical reality, but rather powerful **metaphors and analogues** that allow us to understand the structure and limits of this reality.

Mathematics is not a passive tool invented by the human mind to model nature; rather, as stated in the model by Prof. Dr. Nasip Demirkuş, it is the **"Heart of Science"** and the "universal language" of existence (Demirkuş & Bilgin, 2018b; Wigner, 1960). The relationship established here should be understood not as strict causality or identity, but as an isomorphism (structural and semantic similarity).

1.3. Scope and Methodology of the Study

This report bases itself on the conceptual framework developed by Demirkuş et al. (2018a, 2018b, 2023), subjecting this model to a cross-reading with modern astrophysical literature and classical epistemology.

The methodology is built upon three pillars:

- **Terminological Revision:** The adoption of cosmological and physical terms (Physical Entity, Cosmic Evolution) instead of biologically connoted terms.
- **Epistemological Grounding:** Anchoring the distinction between "Wisdom" and "Science" onto a philosophical and theological ground (*Necessary Being / Possible Being*).
- **Mathematical-Cosmological Isomorphism:** Analysis of structural similarities between mathematical indeterminacy tables (see Figure 3) and cosmological phases.

2. Epistemological Framework and Orders of Being

To understand the origin, structure, and ultimate fate of the universe, the limits of the concepts used must be precisely drawn and their ontological statuses determined. The topological map detailed below, which forms the backbone of the study, will be referred to as **Figure 1**.

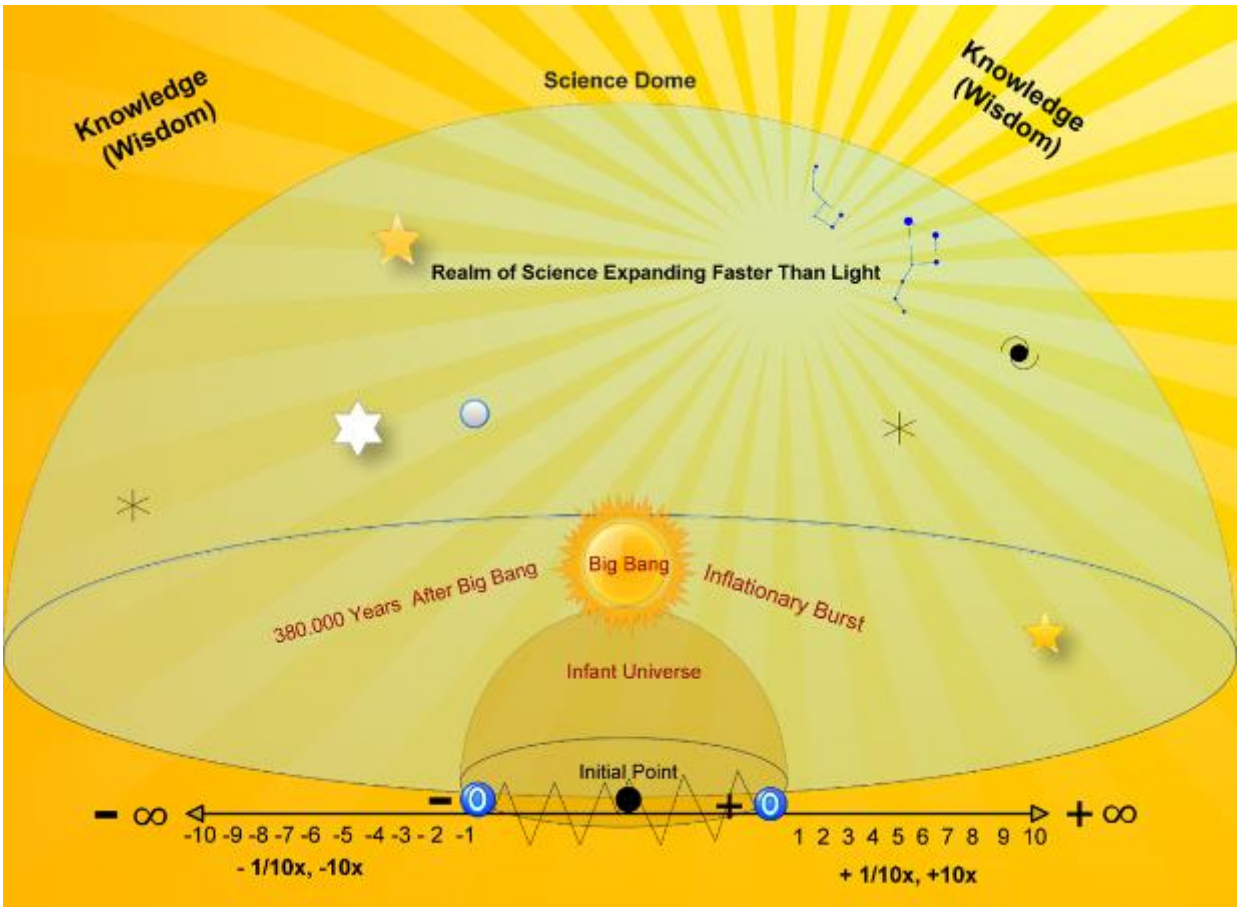

Figure 1 Cosmological Metaphor & Number Line

2.1. Wisdom (İlim): The Absolute, Eternal, and Potential Ocean

In this model, **"Wisdom"** (*İlim*) is defined as the set of absolute knowledge that is independent of time and space constraints, without beginning (pre-eternal) and without end (post-eternal).

In the visual diagram of Figure 1, Wisdom is represented as the boundless area extending to the left of the "First Point" (0) on the number line, towards negative infinity ($-\infty \ldots -1$), covering the exterior of the "Dome-like" (*Science Dome*) structure (Demirkuş, 2016).

2.1.1. Philosophical Origin: Necessary Being and Divine Knowledge

The concept of "Wisdom" resonates deeply with the concept of Ilm-i İlahi (Divine Knowledge) in Islamic epistemology and classical theism. In the tradition of Al-Farabi and Ibn Sina (Avicenna), existence is divided into two main categories:

- **Necessary Being (Wajib al-Wujud):** The absolute source whose existence is intrinsic, whose non-existence is inconceivable, and who is exempt from time and space. This is the ontological source of the "Wisdom" realm in the model (Ibn Sina, 2005).
- **Possible Being (Mumkin al-Wujud):** The subsequently created universe whose existence depends on a cause. This corresponds to the "Science" realm in the model.

The realm of Wisdom expresses the state of "Being" which has not yet entered the form of energy and matter but carries the potential to exist. Here, everything exists potentially (in a state of *subsistence*), but has not yet gained a physical "Existence" (*Vücud*) (Demirkuş & Alkan, 2018a).

2.1.2. Mathematical Correspondence: Imaginary Time and $\sqrt{-a}$

The expression $\sqrt{-a}$ (Square Root of a Negative Number), located on the left side of Figure 1 and in the table of Figure 3, is the most potent mathematical metaphor pointing to this realm.

In the set of real numbers (where $a > 0$), the expression $\sqrt{-a}$ is undefined. However, in mathematics, this expression is defined as an imaginary number ($i^2 = -1$) and opens a new plane beyond the real axis.

This mathematical structure corresponds exactly to the concept of **Imaginary Time** ($t \to i\tau$) used by Stephen Hawking and James Hartle in their "No-Boundary Proposal." This imaginary dimension exists beyond our perceived physical time (the realm of Science) as a field of mathematical necessity and potential (the realm of Wisdom) (Hawking & Penrose, 1970).

2.2. Science (Bilim): The Realm of Physical Existence Separating from Wisdom

Science is the field examining "Physical Entities" that separate from the ocean of "Wisdom" and manifest in the form of energy and matter. In the visual model of Figure 1, the area labeled **"Superluminal Inflationary Science Realm"**, enclosed by a **Dome**, delineates the boundaries of science.

2.2.1. Definition of Physical Entity

The concept previously referred to as "Creature" (Yaratık) has been revised as "Physical Entity" in this report to ensure terminological precision.

A Physical Entity encompasses any object that emerges through the transformation of energy into matter (Einstein's $E = mc^2$ formulation), occupies space in spacetime coordinates, is measurable, observable, and subject to thermodynamic laws (specifically entropy) (Demirkuş, 2023).

2.2.2. The Dome Metaphor and the Observable Universe

The "Dome" in Figure 1 symbolizes the "Hubble Volume" or "Particle Horizon" concepts in modern cosmology. Science investigates events within this dome (horizon), subject to the speed of light (c) limits and the principle of causality.

Important Note: Technically, in cosmology, the Hubble Volume (limit of causal connection) and the Particle Horizon (the furthest distance light has traveled since the beginning of the universe) differ. The 'Dome' metaphor in this model represents the **"Absolute Limit of Scientific Observation"** rather than making a technical distinction. What lies beyond or before the Dome is unobservable due to the speed of light constraint; thus, it is the realm of mathematical prediction ('Wisdom'), not physical experiment ('Science') (Bennett et al., 2013).

2.3. Mathematics: The Heart of Science and Universal Interface

The most unique aspect of the Demirkuş and Bilgin model is its positioning of mathematics not as a tool produced by science, but as the "heart" of science and the mandatory "interface" between Wisdom and Science.

This approach aligns with Sir Roger Penrose's view of "Mathematical Platonism"; mathematical objects possess a real existence independent of the mind. The Demirkuş model establishes the following hierarchy:

Absolute Wisdom (Potential) → Mathematics (Interface/Language) → Science/Physical Entity (Manifestation) (Tegmark, 2014).

2.4. Analysis of Figure 2: Interactive Graph and Asymptotes

Figure 2: tan (x) Function and the Asymptote Metaphor

The "Combined Interactive Analysis" or "tan(x) Function" graph in Figure 2 is the most concrete visual proof of mathematics functioning as the interface between science and wisdom.

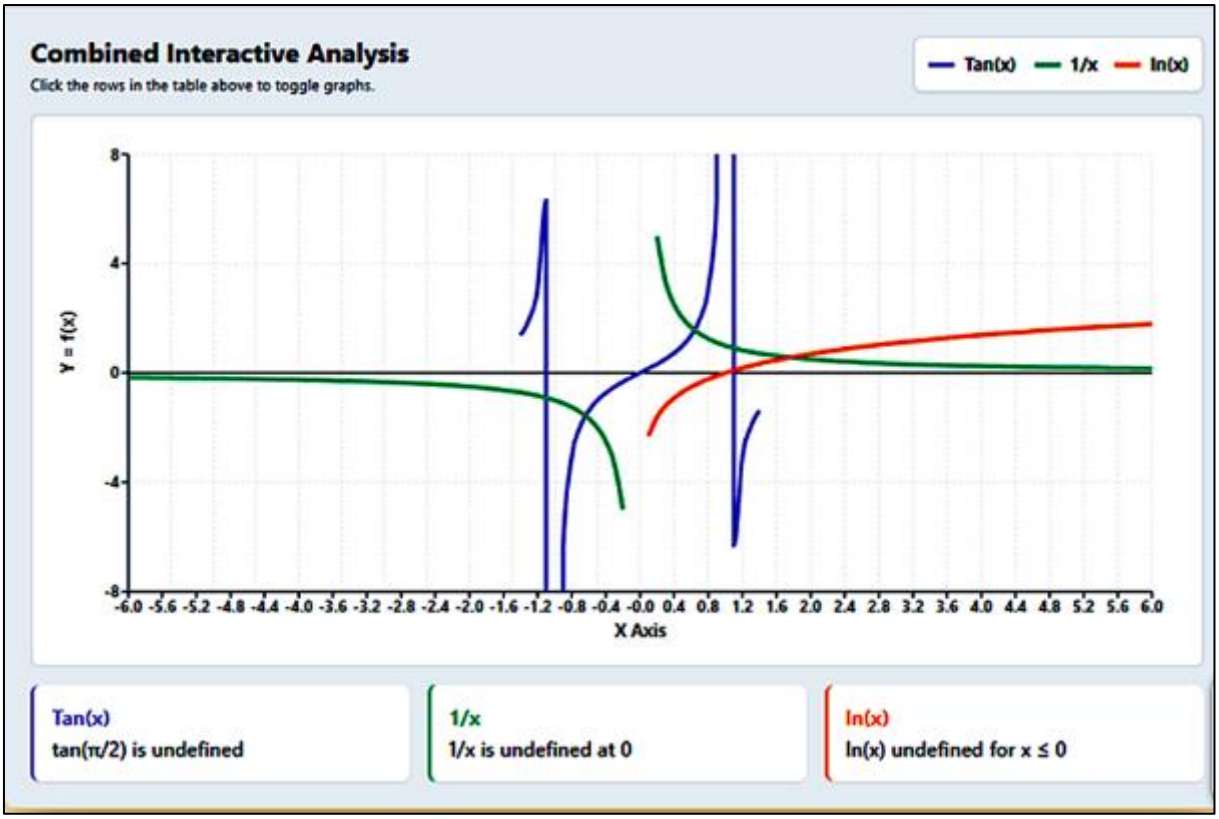

Figure 2 Combined Interactive Analysis

- **Asymptotes and Boundaries:** In Figure 2, the fact that the function $f(x) = \tan(x)$ goes to infinity (∞) at the point $\pi/2$ (90 degrees) and becomes undefined at that point is a visual correspondent of the concept of "singularity" in the physical universe.
- **The Wall Metaphor:** These asymptotes represent the boundaries where Science ends and Wisdom begins. These boundaries are event horizons where physical laws lose their validity.

3. Mathematical Singularities and Cosmological Projections

This section presents a detailed analysis of the "Undefined Expressions" and "Indeterminate Forms" tables presented within the scope of Figure 3 in the original works.

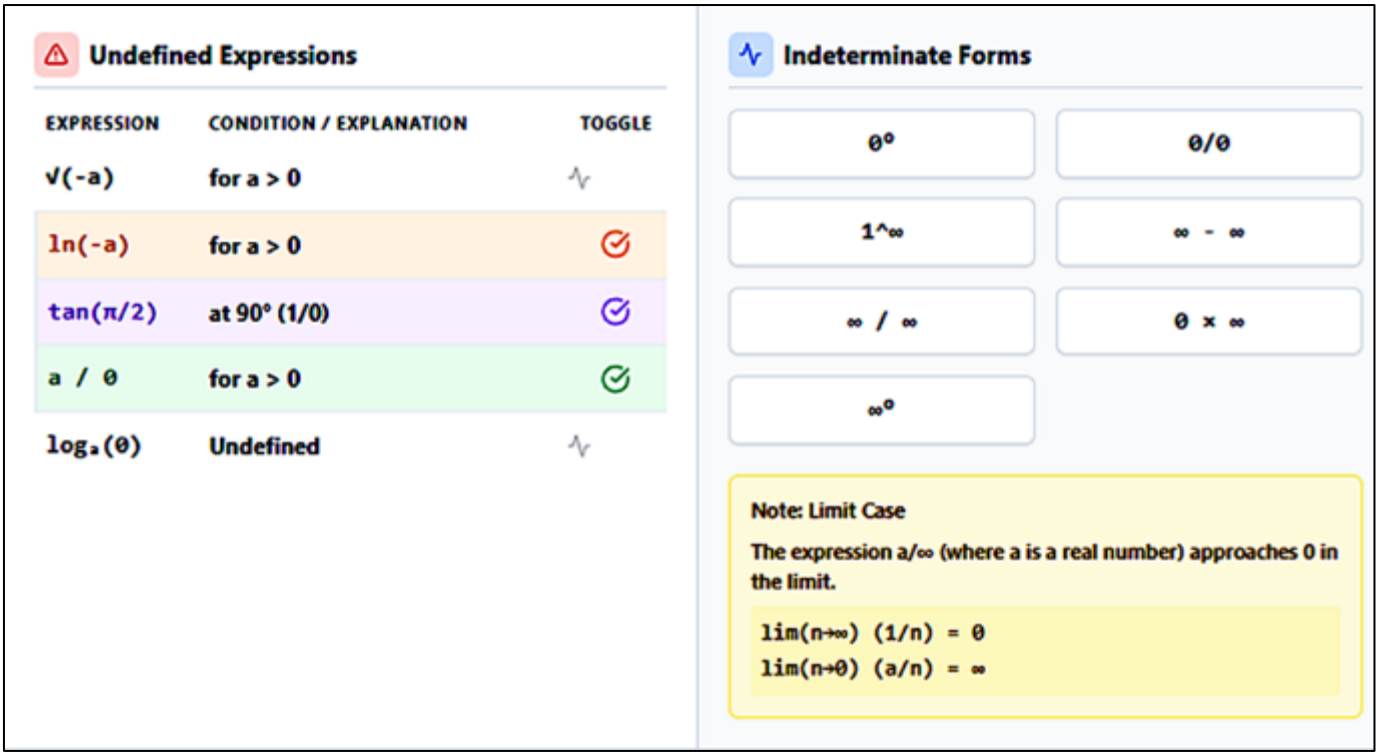

Figure 3 Undefined Expressions and Ambiguous Figures

3.1. "Undefined Expressions" and Ontological Limits

Expressions that have no solution in the set of real numbers ($\mathbb{R}$) but define the boundary conditions of the universe are:

- **Square Root of a Negative ($\sqrt{-a}$) and** ln $(-a)$**:** The first two rows of the table (for $a > 0$) represent states with no equivalent in the real world. These expressions correspond to Hawking's "Imaginary Time" model and the limits of thermodynamic laws.
- **Division by Zero ($a/0$) and "The First Point" (Singularity):** In the table, the expression $a/0$ corresponds exactly to the "First Point" (0) and the "Big Bang" at the very center of Figure 1.
    - *Physical Analogy:* At time $t = 0$, the volume of the universe (V) is zero. In the density equation ($\rho = m/V$), when the denominator is zero, density goes to infinity (∞). This mathematical undefinedness is the very singularity at the moment of the universe's birth (Wald, 1992). This is the gate where science ends and wisdom begins.

3.2. "Indeterminate Forms" and Cosmic Dynamics

The "Indeterminate Forms" located on the right side of Figure 3 include limit processes such as $0/0, 1^{\infty}, \infty/\infty$. These expressions describe a dynamic process of "becoming," not a static state.

- 1^{∞} **(One to the Power of Infinity) and Inflation:** The area shown with the "Big Bang!" explosion in Figure 1 is the resolution of this indeterminacy. It is the mathematical code of Cosmic Inflation theory ($a(t) \propto e^{Ht}$). In the first 10^{-36} seconds of the universe, the universe experienced exponential growth thanks to the "Inflaton" field.
- ∞/∞ **and the Big Rip:** This expression symbolizes the infinite struggle between the expansion of the universe (numerator) and gravity trying to restrain it (denominator).

3.3. Integrated Comparison Table (Figure 3)

Table 1 Integrated Comparison Table

Mathematical Expression	Type	Cosmological Correspondent / Analogy	Ontological and Epistemological Meaning
$\sqrt{-a}$	Undefined (in Reals)	Pre-Big Bang / Imaginary Time	Wisdom (Potential Being): Prior to physical laws, the realm of pure potential and mathematical necessity. Requires imaginary numbers (i) when $a > 0$, pointing to a pre-physical "imaginary" state of being.
$a/0$ $(a > 0)$	Undefined (Divergent)	Big Bang Singularity $(t = 0)$	The First Point (Gateway): The mathematical boundary where volume is zero and density/curvature is infinite. The metaphorical threshold where Science loses validity and the transition from Wisdom to Science occurs.
ln (0)	Undefined	Heat Death / Absolute Zero	Thermodynamic Equilibrium: The ultimate stasis where entropy and the number of microstates are maximum.
1^{∞}	Indeterminate Form	Inflationary Explosion	Cosmic Birth: Exponential growth and the overflow of existence from "Nothingness" (Vacuum). The revelation of infinite potential from a fixed state.
∞/∞	Indeterminate Form	Big Rip	Physical End: The infinite struggle between expansion and gravity, leading to ultimate disintegration.
tan $(\pi/2)$	Undefined	Event Horizon / Limit	Absolute Limit of Knowledge: Like an asymptote where a function goes to infinity; the boundary where information flow ceases and observation becomes impossible.
$0/0$	Indeterminate Form	Quantum Vacuum / Uncertainty	Ontological Indeterminacy: The transitivity between being and non-being or incalculable initial conditions.

4. Cosmic Evolution: Universal Development from Particle to Culture

The concept of "Evolutionary Science" is addressed here not merely as a biological process, but as a unified **"Cosmic Evolution"** process expressing the increase of complexity from the beginning of the universe to the present, as defined by Eric Chaisson (2001).

4.1. The Integrity of Physical Being

The entire area extending from the "First Point" to the "Infant Universe" in Figure 1 represents an uninterrupted line of evolution. According to the Demirkuş model, the category of "Physical Entity" is ontologically whole:

- **Particle Evolution:** Transformation of energy into matter (Quark-Gluon plasma).
- **Stellar and Galactic Evolution:** Gravitational collapse and nucleosynthesis.
- **Biological and Cultural Evolution:** The emergence of self-replicating systems (DNA/RNA) and the process extending to conscious beings.

4.2. Quantum Indeterminacy and Manifestation of Being

In modern physics, the Heisenberg Uncertainty Principle ($\Delta x \Delta p \geq \hbar/2$) states that a particle's position and momentum cannot be known simultaneously with precision. In the Demirkuş model, this situation can be interpreted as an epistemological barrier in the transition from the realm of Wisdom to the realm of Science.

Measuring (the observer effect) collapses the potential (wave function), turning it into a specific "Physical Entity" (particle). This is a micro-scale reflection of the transformation of abstract potential (Wisdom) into concrete reality (Science).

---

5. Detailed Analysis of Visual Models

This section contains detailed descriptions compiled from source files to complete the visualization of the model.

5.1. Figure 1: Wisdom-Science-Mathematics Topological Map

This diagram is a two-axis topological map visualizing all components of the model.

Axes:

- **Horizontal Axis (X):** State of Being / Time Axis. Left to right: Potential (Wisdom) → Transition Point → Manifestation (Science).
- **Vertical Axis (Y):** Magnitude of Density / Energy / Complexity.

Main Regions and Components:

- **Negative Region ($-\infty \dots -1$): Wisdom Area.**
    - *Appearance:* Pale blue or gray, nebulous, undefined boundaries background.
    - *Content:* Area containing undefined expressions like $\sqrt{-a}$, ln $(-a)$. Labels include "Necessary Being," "Imaginary Time," "Potential Being."
- **Center Point (0): The First Point.**
    - *Appearance:* Sharp, mathematical point. Surrounded by the expression $a/0$ and "BIG BANG SINGULARITY."
    - *Meaning:* Interface of Being and Non-being, Wisdom and Science. Absolute zero volume and infinite density.
- **Positive Region ($0 \dots +\infty$): Science Area.**
    - *Appearance:* Expanding to the right, an area defined by clearer lines.
    - *Inflationary Explosion:* A starburst shape immediately to the right of point 0, labeled "INFLATION!", "Big Bang!", containing the expression 1^{∞}.
    - *Cosmic Evolution Line:* An arrow or curve starting from the center and moving right, showing stages "Particle → Atom → Star → Galaxy → Life."
- **The Dome:**
    - *Appearance:* A hemispherical dashed or transparent line covering the positive region.
    - *Labels:* "Hubble Volume," "Particle Horizon," "Speed of Light (c) Limit."
    - *Meaning:* The ultimate limit of the observable universe and causal interactions.

5.2. Figure 2: tan (x) Function and Asymptote Metaphor

This graph illustrates how the behavior of a mathematical function can be a metaphor for physical singularities.

- **Function:** $f(x) = \tan(x)$
- **Graph:** Periodically repeating, steepening, and breaking curves.
- **Critical Points:** At points $x = \pi/2, 3\pi/2, \dots$, the graph has **vertical asymptotes**. The function is **undefined** at these points, and the value diverges to $+\infty$ or $-\infty$.
- **Metaphorical Interpretation:**
    - **Asymptote Lines:** Correspond to the "event horizon" lines in Figure 1. They represent boundaries where science ceases to reach and physical laws fall silent.
    - **Undefinedness of** tan $(\pi/2)$**:** A powerful mathematical analogy for the physical undefinedness and infinity encountered at a black hole singularity or the moment of the Big Bang.
    - **Message:** Mathematics can precisely point out not only what is, but also **the limits of what cannot be**.

6. Cosmological Horizons in the Digital Age: Artificial Intelligence and Big Data

This section extends the "Wisdom-Science-Mathematics" model with new perspectives brought to cosmology by the 21st-century digital revolution and Artificial Intelligence (AI) technologies. The relationship between Wisdom (Data/Potential) and Science (Manifestation) gains a new dimension today through "Big Data" and "Machine Learning."

6.1. AI and Cosmic Data Analysis

Modern cosmological research generates massive datasets exceeding the processing capacity of the human mind. The Vera C. Rubin Observatory is expected to produce terabytes of data every night (Brout, 2025). In the Demirkuş model, the realm of "Science" is now scanned not only by human observation but by AI algorithms ("AI Cosmologist") (Zhang et al., 2025).

- **Classification of Events:** Models developed in collaboration between Oxford University and Google Cloud can detect rare events like supernovae or black hole mergers among millions of celestial bodies with over 90% accuracy (Oxford University & Google Cloud, 2025). This is a new epistemological tool transcending human limits in mapping the diversity of "Possible Being" (*Mumkin al-Wujud*) in the universe.
- **Cosmic Microwave Background (CMB) Analysis:** Subtle temperature fluctuations in CMB maps (Planck data)—the universe's baby picture—are analyzed using neural networks to detect "anomalies" beyond standard models (Bennett et al., 2013; Wang et al., 2022; Amato et al., 2025). These studies trace the transition from the realm of "Wisdom" to "Science" in the model by revealing the structure of quantum fluctuations at the moment of the Big Bang (Singularity/$a/0$) more precisely.

6.2. Simulations and Generative Models (Generative AI)

AI is used not only to analyze data but also to simulate "Cosmic Evolution" processes. Studies using Generative Adversarial Networks (GANs) to upgrade low-resolution universe simulations to high resolution model the dark matter skeleton of the universe and galaxy formations (steps of Cosmic Evolution) (Li et al., 2021).

This provides a philosophical ground aligning with the "Holographic Universe" theory, where mathematical algorithms (Wisdom/Software) can create a simulation of physical reality (Science/Hardware). A UCL-led team achieved predictions of dark energy properties with double precision using these simulations (Jeffrey et al., 2024).

6.3. James Webb Space Telescope (JWST) and the Early Universe

The "impossible early galaxies" discovered by JWST show that the universe reached unexpected maturity a very short time after the beginning (1^{∞} Inflation) (Zhang et al., 2025).

These data support the idea in the Demirkuş model of "potential (Wisdom) transforming into actual (Science) rapidly and intensely." This rapid organization in the first moments of the universe may point to the existence of a strong mathematical/ontological infrastructure (laws of the Necessary Being) rather than mere randomness, as predicted by the model (Demirkuş & Bilgin, 2018b).

7. Discussion: Implications, Limitations, and Future Directions

The "Wisdom-Science-Mathematics" integrated model presents a bold synthesis that bridges disparate domains of inquiry. While offering a coherent onto-epistemological framework, it is essential to consider its implications, acknowledge its limitations, and outline potential avenues for future research.

7.1. Implications of the Model

The primary contribution of this model lies in its **unificatory power**. By reinterpreting mathematical singularities as structural metaphors for cosmological boundaries, it provides a language to discuss the limits of physical inquiry without resorting to reductionism or metaphysical dismissal. The model suggests that the very "failures" of mathematics at singular points are not deficiencies but indicators of a deeper, more fundamental reality—the realm of Wisdom or Potential Being.

Furthermore, the integration of the Islamic philosophical distinction between Necessary and Possible Being offers a robust ontological grounding. This allows the Big Bang singularity to be viewed not merely as a physical initial condition

but as an **ontological pivot**—a moment where potentiality actualizes according to inherent, mathematically expressible principles.

7.2. Methodological Considerations and Limitations

The model's strength—its interdisciplinary and metaphorical approach—also presents its primary methodological challenge. The correspondences established (e.g., **the imaginary unit i** with Imaginary Time, **division by zero** with the Big Bang) are **isomorphic and analogical**, not causal or deductive. This approach, while philosophically rich and heuristically valuable, may be viewed as speculative from the perspective of strict empirical science. The model operates at the level of **interpretation and meaning-making**, proposing a coherent narrative that connects mathematical formalism, physical theory, and philosophical ontology.

A related limitation is the model's **limited predictive power** in the conventional scientific sense. It organizes and reinterprets existing knowledge rather than generating novel, testable hypotheses about specific physical phenomena. Its validation lies more in its explanatory coherence, internal consistency, and ability to integrate diverse knowledge systems than in empirical falsification.

Finally, the synthesis of theological concepts (e.g., Necessary Being) with scientific cosmology may encounter resistance in secular academic circles. The model explicitly operates in a space where these "two cultures" overlap, which, while intellectually ambitious, requires careful navigation to maintain philosophical rigor and avoid conflating distinct categories of discourse.

7.3. Future Research Directions

The proposed framework opens several promising avenues for future inquiry:

- **Refinement of Metaphorical Mappings:** The mathematical-cosmological isomorphism can be further refined and expanded. Future work could explore other classes of mathematical "pathologies" or extensions (e.g., transfinite numbers, non-standard analysis, p-adic numbers) for their potential metaphorical correspondence with cosmological concepts like multiverses or quantum gravity foam.
- **Dialogue with Competing Cosmological Models:** The model should be systematically compared and contrasted with other frontier theories in cosmology and quantum gravity, such as Loop Quantum Cosmology's resolution of the Big Bang singularity or String Theory's landscape of vacua. Does the "Wisdom" realm correspond to a "pre-geometric" phase proposed by these theories?
- **Computational and AI-Driven Exploration:** The model's emphasis on mathematics as the interface suggests a potent role for computational simulation. Future research could involve developing algorithmic or AI-driven models that simulate the "transition" from the indeterminate (Wisdom/Potential) to the determinate (Science/Manifestation), perhaps drawing on concepts from quantum computation or generative neural networks that learn latent spaces.
- **Philosophical and Historical Deepening:** The epistemological foundations warrant further exploration. A more detailed historical analysis could trace the concept of "Ilm" and its relationship to Greek *logos* or other perennial philosophical ideas about ultimate reality. Furthermore, engaging with contemporary philosophy of science debates on scientific realism, structural realism, and the status of mathematics would strengthen the model's philosophical underpinnings.

In conclusion, while the "Wisdom-Science-Mathematics" model may not provide traditional scientific predictions, it offers a powerful **meta-theoretical framework** for understanding the relationship between the knowable physical universe and its ultimate, perhaps unknowable, ground. It invites a continued, nuanced conversation between science, philosophy, and theology at their most profound intersection.

8. Conclusion

The "Wisdom-Science-Mathematics" integrated model is an attempt to reconcile modern science with ancient wisdom. The study has reached the following fundamental conclusions:

- **Mathematical Realism:** Singularities are not errors but the ontological boundary stones of existence.
- **Integrated Evolution:** Matter, life, and consciousness are successive links of a single cosmic process. The concepts of "Physical Entity" and "Cosmic Evolution" have moved the model to a universe-centered plane.

- **Epistemological Synthesis:** The "Necessary-Possible Being" distinction has made it possible to interpret the Big Bang singularity not just as a physical beginning, but as an ontological act of "bringing into existence."
- **Digital Expansion:** Artificial intelligence and big data analytics push the boundaries of the "Dome" (observation horizon), making the correspondences of mathematical potentials in the Wisdom realm more visible in the Science realm than ever before.

Compliance with ethical standards

Acknowledgments

This article was prepared partly with the support of artificial intelligence (Gemini, DeepSeek) in the preparation of sources and writing rules. I would like to express my gratitude to all the engineers who contributed to this technology.

Disclosure of conflict of interest

The author declares no conflict of interest.

Statement of informed consent

Because this study did not include human participants, clinical interventions, personal data, or identifiable information, informed consent is not required.

The informed consent statement has been submitted accurately (based on applicability)

References

[1] Al-Ghazali, A. H. (1997). The Incoherence of the Philosophers (M. E. Marmura, Trans.). Brigham Young University Press. https://www.ghazali.org/books/incoherence-marmura.pdf

[2] Amato, G., et al. (2025). CMB-ML: A Cosmic Microwave Background Dataset for the Oldest Possible Light. ICCV 2025 Conference Proceedings. https://openaccess.thecvf.com/content/ICCV2025/papers/Amato_CMB-ML_A_Cosmic_Microwave_Background_Dataset_for_the_Oldest_Possible_ICCV_2025_paper.pdf

[3] Bennett, C. L., et al. (2013). Nine-year Wilkinson Microwave Anisotropy Probe (WMAP) observations: Final maps and results. The Astrophysical Journal Supplement Series, 208(2),20. https://doi.org/10.1088/0067-0049/208/2/20

[4] Brout, D. (2025). Using Big Data and Machine Learning to Tackle Fundamental Cosmological Questions. Boston University Research News. https://www.bu.edu/hic/2025/02/04/using-big-data-and-machine-learning-to-tackle-fundamental-cosmological-questions/

[5] Caldwell, R. R., Kamionkowski, M., & Weinberg, N. N. (2003). Phantom energy and cosmic doomsday. Physical Review Letters, 91(7), 071301. https://doi.org/10.1103/PhysRevLett.91.071301

[6] Chaisson, E. J. (2001). Cosmic Evolution: The Rise of Complexity in Nature. Harvard University Press. https://www.hup.harvard.edu/catalog.php?isbn=9780674009875

[7] Demirkuş, N. (2016). Humanities, Society, Science and Wisdom Concepts a New Descriptive and Relational Approach. 1st International Conference on Scientific Researches (IBAD), Madrid, Spain, 105. https://nadidem.net/makbil/insanispanya.pdf

[8] Demirkuş, N. (2023). A new approach to the definitions and relations between evolutionary science, basic sciences and mathematics. Magna Scientia Advanced Biology and Pharmacy, 9(1), 14–19. https://magnascientiapub.com/journals/msabp/content/new-approach-definitions-and-relationships-between-evolution-science-basic-sciences-and

[9] Demirkuş, N. (2025). Fen Teknoloji Toplum ve Bilim Felsefesi Ders Notları. https://nadidem.net/ders/ftt.htm

[10] Demirkuş, N., & Alkan, D. (2018a). A Brand New Approach to Sets in Mathematics. Journal of Biometrics & Biostatistics, 9(1), 391. https://www.hilarispublisher.com/open-access/a-brand-new-approach-to-sets-in-mathematics-2155-6180-1000390.pdf

[11] Demirkuş, N., & Bilgin, E. A. (2018b). A New Approach to the Definitions and Relations of the Concepts of Mathematics, Eternity, Infinity, Death, Time and the First Point. Journal of Biometrics & Biostatistics, 9(4), 408. https://www.hilarispublisher.com/open-access/a-new-approach-to-the-definitions-and-relations-of-the-concepts-of-mathematics-eternity-infinity-death-time-and-the-first-point-2155-6180-1000408.pdf

[12] Guth, A. H. (1981). Inflationary universe: A possible solution to the horizon and flatness problems. Physical Review D, 23(2), 347–356. https://doi.org/10.1103/PhysRevD.23.347

[13] Hawking, S. W., & Penrose, R. (1970). The singularities of gravitational collapse and cosmology. Proceedings of the Royal Society of London. A, 314(1519), 529–548. https://doi.org/10.1098/rspa.1970.0021

[14] Ibn Sina (Avicenna). (2005). The Metaphysics of The Healing (M. E. Marmura, Trans.). Brigham Young University Press. https://neoplatonismpod.org/sites/default/files/2021-08/Avicenna_Metaphysics_of_the_Healing.pdf

[15] Jeffrey, N., et al. (2024). More precise understanding of dark energy achieved using AI. University College London News. https://www.ucl.ac.uk/news/2024/mar/more-precise-understanding-dark-energy-achieved-using-ai

[16] Li, Y., et al. (2021). AI-assisted super-resolution cosmological simulations. Proceedings of the National Academy of Sciences (PNAS). https://www.pnas.org/doi/10.1073/pnas.2022038118

[17] Oxford University & Google Cloud. (2025). AI breakthrough helps astronomers spot cosmic events with just a handful of examples. Nature Astronomy (Basın Bülteni). https://www.ox.ac.uk/news/2025-10-08-ai-breakthrough-helps-astronomers-spot-cosmic-events-just-handful-examples

[18] Penrose, R. (2004). The Road to Reality: A Complete Guide to the Laws of the Universe. Jonathan Cape. https://en.wikipedia.org/wiki/The_Road_to_Reality

[19] Penrose, R. (2010). Cycles of Time: An Extraordinary New View of the Universe. Bodley Head. https://en.wikipedia.org/wiki/Cycles_of_Time

[20] Tegmark, M. (2014). Our Mathematical Universe: My Quest for the Ultimate Nature of Reality. Knopf. https://space.mit.edu/home/tegmark/mathematical.html

[21] Wald, R. M. (1992). Space, time, and gravity: The theory of the big bang and black holes (2nd ed.). University of Chicago Press. https://press.uchicago.edu/ucp/books/book/chicago/S/bo3644030.html

[22] Wang, G. J., et al. (2022). Recovering the CMB Signal with Machine Learning. The Astrophysical Journal Supplement Series, 260(13). https://arxiv.org/abs/2204.01820

[23] Wigner, E. P. (1960). The unreasonable effectiveness of mathematics in the natural sciences. Communications on Pure and Applied Mathematics, 13(1), 1–14. https://www.maths.ed.ac.uk/~v1ranick/papers/wigner.pdf

[24] Zhang, X., et al. (2025). AI Cosmologist: An Agentic System for Automated Cosmological Research. arXiv Ön Baskı. https://arxiv.org/html/2504.03424v1