

YOGA: AN ABSTRACT MATHEMATICAL COMPOSITION BETWEEN WESTERN COSMOLOGY AND EASTERN PHILOSOPHY

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Yoga, originating in ancient India, is more than a system of physical exercise. It is a spiritual path that aims to align the individual self with a universal reality. Described in texts such as the “*Yoga Sutras*” of Patanjali, it encompasses ethical principles, meditation and practices designed to transcend the ego and attain unity with the cosmos. In comparison, Western cosmology, particularly through physics and astronomy, explores the origins, structure, and evolution of the universe through observation, mathematical theory and experimentation. While these fields differ in their methodologies introspective versus empirical, they share a deep curiosity about the fundamental nature of existence. Though traditionally seen as a spiritual and philosophical discipline, yoga also reveals itself as a deeply structured system with an underlying mathematical order. The term “*YOGA*” derived from the Sanskrit root *YUJ*, meaning “*TO YOKE*” or “*TO UNITE*” implies the integration of opposites and balancing of forces, an idea that resonates with principles of mathematics such as symmetry, balance, and harmony. When viewed through a mathematical lens, yoga can be interpreted as a composition of patterns, ratios, sequences and geometries that structure physical and meta-physical dimensions of the practice both.

In the physical practice of yoga, mathematical relationships appear in the precision of movement, alignment, and breath. The flow of different postures (*Asanas*) follows specific numerical sequences, like the repetition of sun salutations or the timing of breath control (*Pranayama*) in equal ratio patterns. For instance, in box breathing, the inhale, hold, exhale and hold phases are each timed equally say, four counts emphasizing symmetry and rhythmic consistency. This regulated pattern of breath resembles mathematical cycles and waveforms much like those observed in sine functions and harmonic oscillations. The body, when disciplined through yoga, becomes a moving geometry of which angles, curves, and balance reflecting principles of proportion close to those found in sacred geometry and Euclidean space. The angles formed such as 90 degree bend in Triangle Pose (*Trikonasana*) or equilateral triangle created in Downward Dog (*Adho Mukha Svanasana*) demonstrate a conscious adherence to spatial ratios and balance. Here the yogic practitioner becomes a living geometer manipulating lines, planes and angles in real time. On the other hand, creating structure and form within the body, the practitioner reflects the cosmic architecture, an idea echoed in both Patanjali’s *Yoga Sutras*,

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where alignment leads to “stilling the fluctuations of the mind” and in Tantra, where bodily geometry becomes a gateway to transcendental experience.

So, from philosophical perspective, yoga explores abstract relationships that can be expressed in mathematical terms. The energy (*Chakras*) centers aligned along the spine, have often been associated with vibrational frequencies, colors, and geometric symbols, particularly “*Mandalas*”. These mandalas are not only just spiritual diagrams but also signify symmetrical and fractal-like properties, demonstrating recursion and infinite scaling concepts at the heart of mathematical aesthetics. The spiral motion of energy (*Kundalini*) rising through these centers evokes the Fibonacci Spiral found in nature appearing in galaxies, hurricanes and nautilus shells hinting at a fractal structure in the body’s energy flow. Furthermore, yogic philosophy frequently references the “*Gunas*” (*Sattva, Rajas, Tamas*), which represent dynamic equilibrium among terrestrial and extraterrestrial forces. This triadic balance resembles the chapter of “vector balancing” found in applied mathematics, where multiple forces result in a state of stillness or motion depending on their sum. In Eastern context, yoga is inseparable from the philosophical and spiritual traditions of Hinduism, Buddhism and Jainism. It is based in the concept of “*Moksha*” or liberation (in Buddhism “*Nirvana*” and in Jainism “*Kaivalya*”) which involves transcending the illusions of separateness and realizing one’s unity with “*Brahman*”, the ultimate reality. The practice of yoga aims to harmonize the body and mind in order to facilitate spiritual awakening. The self (*Atman*) is not distinct from the universe (*Brahman*), and realizing the truth is the goal of yogic practice. Time is understood as cyclical, life is seen as a series of reincarnations shaped by *Karma*, and reality is perceived as a dance between illusion (*Maya*) and truth.

Western cosmology born out of enlightenment thinking and the scientific revolution, seeks to understand the universe using reason, Mathematics and observation. The Big Bang theory, quantum mechanics, general relativity and the exploration of deep space have all contributed to a model of the universe that is constantly evolving. Although traditionally rooted in materialism, modern physics has begun to grapple with concepts that echo mystical insight. Time is no longer absolute but relative, depending on gravity and velocity. Theoretical models such as string theory and the multiverse hypothesis propose dimensions beyond ordinary perception. These scientific revelations, while framed differently, suggest a universe far more complex, interconnected and mysterious than previously thought.

While yoga is traditionally rooted in eastern philosophy, its relevance in western cosmology has grown in recent decades as scientists and philosopher alike grapple with questions that transcend empirical boundaries. Western cosmology, historically grounded in observation, mathematics and physical laws, has long sought to understand the universe through a materialist and reductionist lens. One of the primary

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intersections between yoga and western cosmology lies in the role of consciousness. The idea of awareness itself participates in shaping the cosmos resonates with yogic principles found in texts like the *Upanishads* and the *Yoga Sutras*, where the seer and seen are ultimately non-dual although dual of the dual is primal.

Additionally, yoga's holistic understanding of the microcosm and macrocosm finds surprising parallels in cosmological models. The yogic idea that the human body mirrors the cosmos, a concept found in *Tantra* and *Vedanta*, mirrors current efforts in Western science to reconcile the laws governing the quantum realm with those operating on a cosmic scale mathematically. Yoga, through its meditative and experimental practices, provides a symbolic and practical framework for understanding this unity. Practitioners of yoga often report dissolution of self-boundaries and a direct sense of connection with the cosmos-an experience that parallels theoretical models proposing that everything in the universe is fundamentally entangled and interdependent. Moreover, the cyclic view of time in yoga aligns intriguingly with emerging scientific theories. While western cosmology traditionally views time as linear, marked by the Big Bang and an eventual heat death or collapse, newer models such as cyclic cosmology, loop quantum gravity and multiverse theory suggest a more complex, perhaps even circular or regenerative, notion of cosmic time. These ideas find a philosophical kinship in yogic cosmology, which speaks of *Yugas* (cosmic ages) and the eternal recurrence of creation and dissolution. The rhythm of the universe-expansion and contraction, order and chaos is mirrored in yogic breathing patterns, meditative cycles, and metaphysical thought.

While yoga is not a scientific theory in the empirical sense, it offers a lived and experimental approach to understanding the universe that increasingly complements Western cosmology's theoretical explorations. In the West, thinkers such as Fritjof Capra, Rupert Sheldrake and Deepak Chopra have attempted to interpret yoga and consciousness in light of scientific discovery, often facing criticism for stretching metaphors. Still, their work represents a growing desire to integrate inner experience with outer knowledge. Yoga, in this cosmological dialogue, becomes more than a cultural import. It evolves into a philosophical partner in the effort to reconcile the objectives and the subjective, the spiritual and scientific.

The meditative and transcendental aspects of yoga also exhibit mathematical abstraction. In states of deep meditation, practitioners report the dissolution of time and form, a kind of cognitive experience that parallels mathematical infinity or zero, where finite distinctions collapse into unity. "*Samadhi*" (Yogic Unity) is often described as a singularity of awareness, and in mathematics, a singularity refers to a point at which known laws cease to apply, much like the state of consciousness yoga aspires to reach. In this sense, yoga can be metaphorically described as a metaphysical journey towards a mathematical "*Limit*"

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(ultimate union of self with the infinite).

Contemporary researchers have also attempted to model aspects of yoga mathematically, especially in fields such as biofeedback, neural oscillation, and chaos theory. The human breath cycle, heart rate variability during meditation and brainwave synchronization under yogic states can all be measured and modeled using nonlinear dynamics and feedback loops. These findings support the view that yoga induces coherence and order in our body's systems, akin to achieving resonance in mathematical systems. In its fullest form, yoga is a multidimensional system with embedded mathematical harmony. Whether through its structured sequences, breath cycles, geometric symbols or philosophical abstractions, yoga exemplifies the precision, rhythm and balance inherent in mathematical composition. Far from being irrational or unstructured, yoga is a system that both invites and withstands mathematical interpretation, revealing yet another layer of its universal applicability and timeless intelligence.

Therefore, Yoga, in its richest philosophical form, stands as a timeless expression of the human desire to comprehend the nature of being. As western cosmology pushes the boundaries of what mathematics can explain, it begins to circle back to questions long addressed by Eastern traditions. Yoga emerges as a medium like abstract mathematical composition through which these perspectives can converge not through reduction, but through dialogue. It offers a holistic framework where inner and outer realities are reflections of the same truth but where consciousness is both the lens and landscape of the cosmos. In this way, yoga acts not merely as a practice but as a philosophical bridge between Mathematics and spirit, East and West, the seen and the unseen.

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