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Adaptation of Geometric Knot Patterns and the Principle of Perpetual Creation in the Views of ibn Arabi

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Abstract

Geometric knot patterns represent a fundamental element in Islamicmosque architecture, carrying profound significance beyond their visual appeal. These patterns embody the monotheistic worldview of Muslim artists, with their beauty enhanced when the relationship between form and meaning is revealed. This study employs the theoretical framework of Muhyiddin Ibn Arabi's theory of perpetual creation to analyze these artistic expressions. As a prominent 6th-7th century AH mystic, Ibn Arabi's ideas gained widespread influence across the Islamic world. His theory of continuous creation, rooted in Islamic theological atomism, offers significant insights into divine creativity and existence.

This research aims to analyze geometric knot patterns generally and those of the Yazd Grand Mosque dome specifically through Ibn Arabi's perpetual creation theory. The study addresses two primary questions: What relationship exists between geometric knot patterns and Ibn Arabi's theory of continuous creation? How can this relationship be analytically demonstrated?

Using analytical-comparative methodology, five key principles of Ibn Arabi's theory (Essence, Manifestation, Infinite Possibility, Non-Repetition in Manifestation, and Non-Static Existence) were compared with fundamental features of knot pattern design. The findings reveal that Muslim artists, as creators of geometric knot patterns, first establish the pattern's root through nucleus design. Through line extensions, knot patterns (manifestations) emerge, characterized by dynamic movement and infinite generative potential. Artists creatively derive new knot forms from existing ones, demonstrating innovation and non-repetitive manifestation. Thus, the monotheistic philosophy of Muslim artists finds expression in geometric knot patterns.

Key words: *Ibn Arabi, Continuous Creation, Yazd Grand Mosque Dome, Geometric Patterns, Islamic Architecture*

Introduction

Geometric knot patterns constitute unique artistic expressions in Islamic art, particularly in architectural contexts. Since early Islamic centuries, these patterns have held special significance in Iranian mosques, characterized by repetition, vitality, creative potential, and expansive scalability. Their origins remain a crucial subject in Islamic art studies.

The relationship between God, existence, and creation has engaged Islamic scholars since Islam's emergence. Muslim artists consistently reflected prevailing intellectual currents of their eras. Ibn Arabi's theory of "continual creation" represents a significant perspective in this discourse. Muhyiddin Ibn Arabi, a 6th-7th century AH Sufi philosopher recognized as the father of Islamic mysticism, demonstrated remarkable artistic creativity in theological and literary domains. His ideas gained prominence during his lifetime and continued influencing subsequent centuries.

The "continual creation" theory traces its roots to early Islamic theologians (Mu'tazilites and Ash'arites). According to Ibn Arabi's philosophy, when existential reality descends to the level of attributes and names, it manifests visibly. Multiplicities emerge consequently, with the world

and all creatures, including humans, appearing as manifestations of unified reality.
Ibn Arabi's theory posits that the world comprises jewels and entities, nothing remains fixed or static, constant change occurs moment by moment, and everything ultimately returns to unified existential source. Each new creation establishes itself based on divine manifestation's unique character, with existence continually adorned in new garments of manifestation.
Considering Ibn Arabi's intellectual system regarding "continual creation" and extracting inherent principles (including substance, accident, infinite possibility, non-repetition in manifestation, and absence of permanence) provides an appropriate framework for interpreting knot geometric patterns. This research primarily focuses on knot geometric patterns, selectively employing patterns and inscriptions from inside and outside Yazd Grand Mosque dome for supplementary analysis.
Given this theory's widespread influence on Muslim artists' intellectual dimensions and knot geometric patterns' position in Islamic art, establishing structural and meaningful relationships between "continual creation" theory and desired knot geometric patterns constitutes this study's primary objective.

Method

Research Design

This study employs analytical-comparative methodology, examining relationships between geometric knot patterns and perpetual creation theory through systematic comparison and analysis. Data collection utilizes library resources, including theses, articles, books, and reputable websites, with particular focus on primary sources concerning Ibn Arabi's philosophy and technical studies of Islamic geometric patterns.

Population and Sample/ Study Group/Participants

This research primarily focuses on knot geometric patterns, selectively employing patterns and inscriptions from inside and outside Yazd Grand Mosque dome for supplementary analysis.

Research Background

Scholarship examining geometric patterns and Ibn Arabi's philosophy demonstrates rich academic engagement. Golroo Najiboghlu (1389/2010) in "Geometry and Ornamentation in Islamic Architecture" emphasizes environmental influences on Islamic artistic expression, particularly abstract patterns' crucial role. She connects theological debates with Samarra's decorative styles, suggesting these ideas influenced Muslim artists' pattern creation. However, her work doesn't explicitly link these concepts to perpetual creation theory.

Madkour et al. (1388/2009) in "Symbolism in Ibn Arabi's Thought" provide foundational explanations of symbolic elements in his works, offering valuable insights for decoding geometric patterns.
Nasr (1384/2005) in "Science and Civilization in Islam" contends that Muslim enthusiasm for mathematics, geometry, and numbers stems from Islam's fundamental message, connecting this belief to monotheism. He argues that geometry and mathematics refine artistic matter, creating sacred spaces manifesting divine presence.

Titus Burckhardt (1376/1997) in seminal works on Islamic art foundations perceives geometric patterns within symbolic-philosophical contexts as psychologically influencing worshippers and reinforcing unity in mosque environments. His analysis emphasizes how infinitely expandable geometric forms create order and harmony consistent with Islam's nature.

Grabar (1992) in "The Mediation of Ornament" identifies geometry as both perception mode and creative process, coordinating proportions while reflecting philosophical-mathematical concepts.

Existing literature reveals a significant gap: the absence of systematic comparative analysis between geometric knots' structural components and Ibn Arabi's perpetual creation ontological principles. This study addresses this gap through detailed comparative framework development.

Data Analysis

The research addresses these questions:
1. Can knot geometric patterns' structure be interpreted through "continual creation" theory's principles?
2. What relationship exists between knot geometric patterns' drawn elements and "continual creation" theory's constitutive principles?

Findings

Besides numerous geometric knot patterns examples Iranian architecture, we observe Yazd Grand Mosque dome within, selected sample, geometric knot patterns where artist, through motif creation and expanding, moving, and rotating it, has arrived unique knot pattern dome interior. This pattern name "Rotating Six, Seven,

and Sixteen-Knot Patterns," designed uniquely non-repetitively this dome. We also encounter remembrance principle dome exterior. Actually, Yazd Grand Mosque dome interior and exterior embody continuous creation principle Ibn Arabi views.

Discussion

The Theory of Perpetual Creation in Ibn Arabi's Views:

The God-creature relationship represents one of Islamic scholarship's most significant concerns. Ibn Arabi's perpetual creation theory offers particularly important insights here. Muhyiddin Ibn Arabi, a prominent 6th-7th century Islamic mystic, saw his beliefs and philosophy widely disseminated by disciples and commentators. His profound Sufi thought influence made his views dominant across much of the Islamic world.

His two major works, "Fusus al-Hikam" and "Futuhat Makkiyya," stand as prominent contributions. "Futuhat Makkiyya" comprises revelations received during Kaaba circumambulation in Mecca, encompassing comprehensive metaphysics, theology, cosmology, spiritual anthropology, psychology, and jurisprudence. Its topics include Islamic rituals' inner meanings, spiritual travelers' stages, cosmic order's nature, Arabic alphabet's spiritual significance, and sciences contained within divine names (Chittick, 2014, pp. 12-17).

In "Futuhat Makkiyya," Ibn Arabi explores perpetual creation theory through symbols and metaphors, asserting the Quran's abundance of divinely mentioned examples employing metaphor, allegory, and simile (Madkoor, 2009, p. 69). Although contemporary art receives no explicit attention in his views, aesthetic foundation principles can be extracted from his anthropological and cognitive ontology.

According to his perspective, "existential reality is singular, containing no plurality. This existential reality represents the exalted, absolute, hidden God's essence, having no manifestation. When existential reality descends to names and attributes level, manifestation becomes necessary. Through this manifestation and revelation, multiplicities and determinations emerge. Thus, the world and all beings, including humans, originate as that singular truth's manifestation" (Chittick, 2009, p. 135).

Ibn Arabi explains that the world undergoes constant change, with God creating different worlds at every moment. His theory addresses creation's process and quality, based on mystical ontology and intuition while resembling Islamic theology's Ash'ari school atomism perspective.

Before Ash'arites, Mu'tazilite theologians (early Islamic philosophers prioritizing reason in religious arguments) raised substance, accident, and void issues explaining divine creation. The individual substance concept, essential to Islamic theology's atomism theory, was initially introduced by Zirar ibn 'Amr (d. 190 AH) but clearly formulated by Mu'tazilite theologian Abu Huzail Alaf (d. 226 AH) in early third century (Wolfson, 1949, pp. 507-508). Generally, theological atomism defines the world as comprising particles and accidents undergoing continuous transformation, all constantly connected to omnipotent singular God though imperceptibly. Louis Massignon, Georges Marçais, and Etienne Gilson advocated Islamic art's intrinsic nature, attributing its evolving abstractions to atomism philosophy (Balakhari, 2015, p. 185).

From Ibn Arabi's perspective, Ash'arites referenced atomism theory and "al-'ard la yabqa zamanan" principle (perpetual accident renewal) concerning continuous creation. This principle explains that accidental attributes cannot exist independently of substances. Thus, when atoms create in specific moments and places, they belong exclusively to those spatiotemporal contexts. Changing time and place would require specific attribute changes, which is impermissible. Consequently, in subsequent moments, atoms recreate with that moment's specific attributes. This view posits constant world renewal (Eftekhari, 2020, p. 7), with all existence continuously changing and refreshing.

Muhyiddin Ibn Arabi (d. 638 AH/1240 CE) addressed perpetual creation based on Quranic verses like "بَلْ هُمْ فِى لَبْسٍ مِّنْ خَلْقٍ جَدِيدٍ" ("Rather, they are in confusion about a new creation"). He elaborated continuous creation and perpetual renewal theory, referencing Ash'arite atomism. Ash'arite atomism's most prominent aspect involves perpetual accident renewal, whereby the contingency world comprises substances and accidents. Substances remain constant while accidents undergo change and renewal processes;However, Ibn Arabi believed substance-accident distinctions vanish in perpetual renewal processes. Drawing on Quranic sources, he highlighted Ash'arite theory's deficiencies, criticizing their perspective. This gave continuous creation theory special significance within theoretical mysticism (Golnavaz and Khayatan, 2019, pp. 5-6).

Ibn Arabi's continuous creation theory asserts nothing remains fixed or stagnant, with the world undergoing constant flux and change. Each moment brings transition from one state to

another, ultimately returning to unified existence's primary source. New creation establishes itself based on divine manifestation's unique, unrepeatable concept. According to this theory, creation as existential rule and law represents eternal, interconnected movement through which existence manifests in myriad forms. Creative existence constitutes the same eternal, everlasting essence or substance manifesting in countless forms instantaneously. Therefore, creation as divine inner manifestation and revelation takes various beings' existential forms (Karban, 2023, p. 302).

As mentioned, continuous creation theory has historical roots (in Mu'tazilite and Ash'arite theological discussions) while maintaining influence in its time and subsequent periods.

Important Elements in Continuous Creation Structure (Table 1)

Soul of the Merciful

Ibn Arabi states that"The world manifests within the Soul of the Merciful" (Jundi, 1423 AH, 545). Qaysari's Fusus al-Hikam commentary writes: "The Merciful Soul means the world's expansion and manifestation in beings" (Qaysari, 1375: 295). This unity represents the unique reality called existence, identical with Truth, all beings being His existential manifestations. They interpret from this essence, with all besides Him depending on Him, termed "dependents" herein.

Essence

Philosophically,"essence" means inherent, independent nature free from others. Essence itself constitutes the absolute reality manifesting divine essence, with shared direction between divine essence and essence existence-wise. Just as Truth's reality, followers, and divine names subordinate to these stations, so do various essentialities and accidents realities, all subordinate to essences.

Accident

Contrasting essence and substance,accident represents existential quality requiring another being's existence, namely essence. For example, heat or cold constitutes water's accident, since water can exist or be conceived without these qualities.

From Ibn Arabi's views, we can deduce his perception of God as essence and entire universe as accidents, meaning all worldly phenomena comprise accidents entirely. Qaysari, Fusus' famous commentator, considers the possibilities world, including gems and accidents, all established by God, hence calling them accidents: "The entire world, being an accidents world, establishes through Divine essence" (Qaysari, 1375: 48).

Izutsu expresses Ibn Arabi's perspective as considering God the eternal, ultimate essence, with all worldly existences (whether gems or accidents) actually being manifestations becoming visible and unstable on ultimate essence's surface, like countless bubbles appearing and disappearing on water's surface. All these are accidents because even philosopher-considered gems, when distinguished with accidents, from Ibn Arabi's viewpoint, constitute nothing but specific ultimate essence determinations' form. Therefore, Ibn Arabi designates God the eternal, ultimate essence herein. This interpretation might mislead, so we shouldn't overlook Ibn Arabi's metaphorical use of Aristotelian essence-accident terms. Thus, designating God as essence resembles... from Ibn Arabi's viewpoint; God represents pure existence and must transcend every concept (Izutsu, 1364: 44).

Infinite Possibility

Possibilities'infinite nature relates to things' perpetual renewal discussion, since possibilities are potentially infinite, possibility being endless treasure God uses continuing creation. Ibn Arabi references this matter under "And there is not a thing except that with Us are its depositories, and We do not send it down except according to a known measure" (Quran 15:21). This implies existence can only manifest through possibilities' forms, like water beneath God's throne: "And His Throne had been upon water" (Quran 11:7), indicating it can take any form or vessel. However, since one form hinders other forms' acceptance, world-manifesting existence cannot be infinite. Therefore, beyond beings' weak appearance lies infinite possibilities ocean, whose surface waves constantly renew. Ultimately, every new state in every changing situation represents possibilities' new creation, like the first's creation but not identical (Chittick, 1395: 207). Infinite possibilities ocean concept refers to continuous birth and creation accompanied by constantly occurring diversity and multiplicity.

Non-Repetition in Manifestation

This rule,among Ibn Arabi's perpetual creation doctrine's important elements, states: "But unveiling's people see God manifesting in every soul without repeating His manifestation. They also witness, as testimony kind, that each manifestation produces new creation while removing previous ones. This exactly resembles annihilation during

manifestation and subsistence during concealment, but He gives to another (Ibn Arabi, 1366: 126)." However, revelation's people believe God manifests repeatedly in every soul, their view holding that every manifestation removes created things while granting new creation. Therefore, removal (that creation) means annihilation when manifested and subsistence when concealed, because another manifestation gives.

Khwarizmi, Fusus' commentator, explains Ibn Arabi's statement thus: His manifestation doesn't repeat because annihilation leads differ from subsistence leads. Every moment brings annihilation and subsistence, so necessarily manifestation shouldn't be repetitive (Khwarizmi, 1368: 448). This rule's meaning bases on manifestations' multiplicity, meaning Truth's multiple manifestations involve no repetition, each manifestation being something new. This leads to "new creation" inference.

According to him, established beings indicate any possible form or state characterized by existence. Since established beings are infinite, each one's manifestation never repeats. Therefore, only divine expansion recognizers realize nothing in existence repeats. Rather, similar things are conceived as appearances, but they aren't identical to those things; they resemble specters and resemblances, not identical to them (Ibn Arabi, 1946: 432).

The Absence of Rest in Existence

Among Ibn Arabi's continuous creation proof arguments is rest or immobility state absence.He believes change undergoes transformation from one state or position to another, resembling metamorphosis. He states this form-to-form change, whether similar or dissimilar, can occur in imagination world, senses world, or universe anywhere. This is because entire universe constantly experiences change and transformation, this change's principle being divine form transformation mentioned in authentic traditions. Based on this, God manifests in meanings and forms, changing from one meaning to another and one form to another. Therefore, according to God's word that "He is in different state every day," He becomes worlds or universe realization cause through state changing (Ibn Arabi, 1946, Vol. 3, pp. 198-199).

He further explains God-world relationship, stating God's world-manifested effects constitute world's same states constantly undergoing change and transformation (Ibid: 315). According to Sheikh Akbar, movement possesses significant influence observable in material bodies and their properties. It represents rational meanings one, whose limit remains unknown, flowing through all beings. Its primary rule entails entities transitioning from non-existence to existence state, nothing in existence realm remaining fixed because stability interprets as movement absence (Ibid, Vol. 2: 629).

His view holds that God, through perpetual creation, leads to beings' realization and transformation, while created beings remain in constant need and poverty. Therefore, every existence always stays in change and movement state, since creation doesn't arise from rest state. Constant transformation speed and continuity's driving force constitutes same fundamental transformation (Truth) (Ibid).

Table 1 Main Elements of Continuous Creation Theory (Author)

Name	Characteristics
Essence	Means essence, independent of others. The essence itself constitutes unified reality manifesting divine nature.
Accident	Contrasts essence and substance, being dependent on and subject to essence.
Infinite Possibility	Permanently occurring birth and creation accompanied by diversity and multiplicity.
Non-Repetition in Manifestation	Truth's multiple manifestations and appearances, non-repetitive, each manifestation being new affair.
Absence of Rest in Existence	Motion constitutes existence's formation agent.

Geometric Knot Patterns:

Geometric knot patterns formation, based on polyhedra diagrams from 3rd-4th centuries AH, differs from traditional network structure-based geometric patterns dating to pre-Islamic times. These patterns' emergence attributes to rational thinking influence in early Islamic scholars' discussions, leading to mathematics and geometry prevalence. Over time, geometric knot patterns flourished and evolved.

Seljuk period represents when, besides traditional network pattern use, new geometric knot patterns style developed embellishing artistic surfaces. This centuries-spanning development gradually transformed it from nature-oriented artisans decorations peripheral role to Seljuk era dominant decoration. As this pattern peaked over centuries evolving through specific mathematical rules, it

reflects Muslim thinkers' philosophical-mystical thoughts this period.

Among most significant Islamic patterns stands geometric knot pattern. Examining its characteristics and evolution among Muslim artists reveals Muslim scholars' monotheistic principles therein. Based on this, Ibn Arabi's continuous creation theory presented principles compare with geometric knot pattern characteristics.

A knot constitutes cohesive various geometric patterns combination arranged harmoniously and complementarily within defined framework (Haji Seyyed Javadi, 2015: 5). Knot carving represents cut tiles, plaster, brick, and wood pieces assembly art into various repeatable patterns with geometric unity concept, all coordinated within specified repeatable frame. These geometric patterns divide into two groups drawing-wise: 1) Simple geometric patterns, and 2) Complex geometric patterns.

The first group possesses ancient Iranian art roots, follows simple drawing rules, and bases on regular geometric networks. Its origins trace back to ancient Iranian art, utilized in Sassanian and Byzantine civilizations, continuing Islamic era usage(see Images 1b, 2b).

The second group's patterns possess more complex drawing rules compared to first group. Their roots trace back to significant cultural-scientific developments during Abbasid era 3rd-4th centuries AH (see Images 3b, 4b). Regular patterns distinguishing feature compared to older network models-based patterns lies in structure and general drawing guidelines bringing about specific angles and components proportions. In other words, network pattern or grid utilizes squares and equilateral triangles fine patterns achieving its design (see Images 1a, 2a and 1b, 2b).

Image 1a: Border Drum and Pili Pattern Based on the Oblique Square Grid (Anbari Yazdi, 2016: 29)

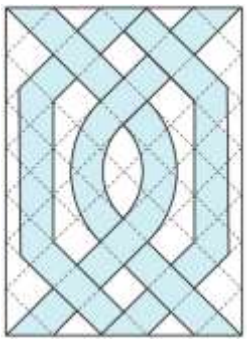

Image 2a: Border Drum and Pili Pattern Grand mosque of Yazd (Ambari Yazdi, 2016: 29)

Image 3a : Octagonal Knot and Square Star Motif (Ambari Yazdi, 2016: 41)

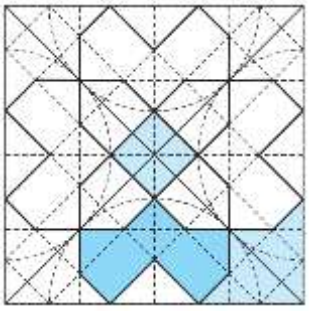

Image 4a : Octagonal Knot and Square Star Motif, Mosque of Gowharshad, Mashhad (Ambari Yazdi, 2016: 41)

However, regular geometry new structure, ultimately blossoming during Seljuk period and producing renowned "knot" style, primarily bases on drawing circles and geometrically partitioning them (see Images 3a, 4a and 3b, 4b). This group's early examples observe in Samarra patterns dating to 3rd century AH. These new structure-belonging patterns were used sparingly and are much simpler compared to later geometric patterns. This underscores that Samarra patterns decoration marks initial phase of style later evolving into famous Seljuk knot style.

Notably, simultaneous occurrence exists of speakers like Abu Huzail Alaf's discussions regarding particles nature, divisibility, motion, rest, etc., alongside new structure patterns creation in Samarra mosques and palaces. Classical plant and geometric patterns transformation into Samarra incised style, Abbasid capital from 223/838 to 279/892, constitutes revolutionary invention (Oğuzlu, 2010: 131).

Two significant events in these patterns emergence include Greek philosophical-mathematical texts translation and subsequently rationalist thought school (Mu'tazilites) emergence. Greek mathematical treatises translations and geometric treatises emergence, including Buwayhids practical geometry treatise and Khayyam geometric equations, represent some examples. Some treatises contain titles and introductions indicating various artisans practical application, including craftsmen, architects, and artists (Besheshti Nejad, Samaniyan, Maziyar, 2021: 115).

We can say Mu'tazilite school discussions, including atoms, indivisibility, manifestations, motion, rest, etc., impacted artists perspectives. These abstract concepts closely related to mathematics, since mathematics departure point involves abstract number concepts emergence. Artists also leaned toward mathematics and geometry use demonstrating abstract concepts in Islamic array patterns. Actually, abstract discussions two components, namely Mu'tazilite school and mathematics-geometry prevalence, led Muslim artists toward geometric knot patterns leaning and creation.

As previously mentioned, Ibn Arabi's continuous creation theory aligns with monotheistic beliefs evolution (indivisible particles belief) among Muslims from early Islamic centuries. Ibn Arabi addressed indivisible particles concept and criticized Ash'ari view, presenting his continuous creation theory based on Quranic verses, stating world changes constantly and God creates different world every moment

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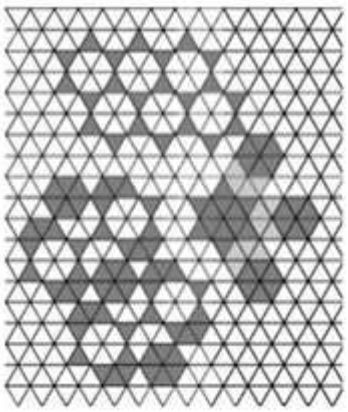


Image 1b : Geometric Decoration Based on Grid Pattern
Ornamentation: Grape Leaf and Cluster, Stucco, Khirbat al-Mafjar, Umayyad
(Baer, 1998, 9)

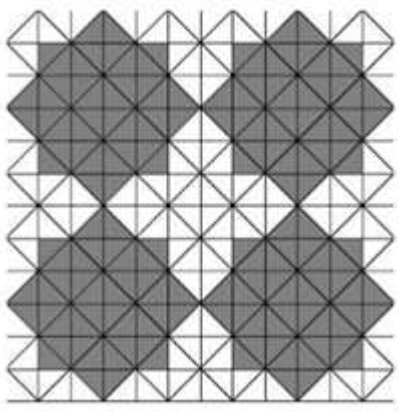


Image 2b: Geometric Decoration Based on Grid Pattern
Ornamentation: Hairpin Leaf, Stucco, Style "Alif," Samarra
(Herzfeld, 1923, figure 299)

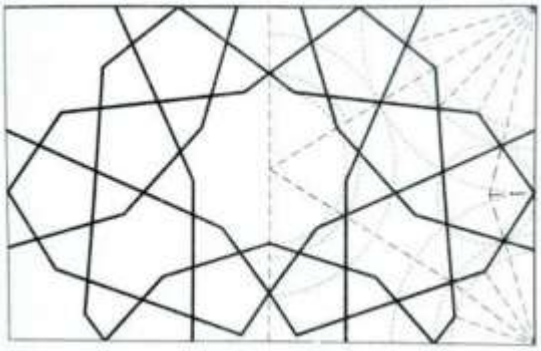


Image 3b: Complex Geometric Design (Knot) Ornamentation: Style "B," Samarra, Stucco, Bab al-'Amma
(Herzfeld, 1923, figure 330)

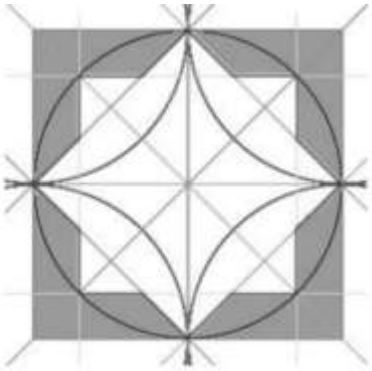


Image 4b: Complex Geometric Design (Knot)
Ornamentation: Style "C," Samarra, Stucco
(Herzfeld, 1923, figure 122, Ornament 124)

Islamic scholars views regarding universe divine creation evolved throughout Islamic history, from Mu'tazilite theologians indivisible particles and atoms discussion to Ash'ari universe eternity theory, finally reaching Ibn Arabi introduced continuous creation concept.

Mu'tazilites, Ash'arites, their followers, later Ibn Arabi and his commentators debates created intellectual spaces profoundly influencing artists. This led them toward knot patterns focus and their subsequent centuries evolution.

One notable geometric knot pattern example analyzable through Ibn Arabi's continuous creation theory and remembrance principle context involves patterns array inside and outside Yazd Grand Mosque dome.

Yazd Grand Mosque Case Study:

Yazd Grand Mosque constitutes architectural masterpiece situated desert heart. Construction spanned approximately 100 years across three different periods. Mosque main foundation laid Sassanid era atop fire temple. However, post-Islam advent, completion occurred Seljuk, Ilkhanid, and Timurid periods. This mosque founder, Alāʾ al-Dawla Kālānjār, belonged Al-e Buyeh dynasty, ruling Yazd Seljuk era. Dome chamber construction dates Ilkhanid period, while magnificent portal and minarets completed Timurid period (Pirnia, 2004: 204).

This mosque represents Iran historical treasures one, various elements different building parts preserved. Mosque tilework, grand portal, minarets, and inscriptions stand among 9th century AH most exquisite architectural masterpieces.

Yazd Grand Mosque presents beautiful unique geometric patterns. Among these patterns, dome geometric designs selected, aligning this research theme. This study focuses geometric knot patterns generally. Further detailed analysis takes selective approach, utilizing patterns and inscriptions both inside and outside Yazd Grand Mosque dome.

Yazd Grand Mosque dome underside reveals six-pointed, seven-pointed, and sixteen-pointed knots patterns. As mentioned earlier, knot pattern belongs second group, including more complex patterns.

Knot Components Analysis:

Knot components include "wagireh" (element), "vahed-e-gereh" (knot unit), "alat-e-gereh" (knot instrument), and "kadre-gereh" (knot framework).

Wagireh represents each knot smallest repeating unit, drawn specific manner within defined framework. Knot becomes apparent after wagireh repetition specific directions[^6]. This observes Image 5 and Image 6.

Yazd Grand Mosque dome exhibits wagireh expanded circularly, covering dome underside entire circle. (Image colored section indicates wagireh radial expansion.)

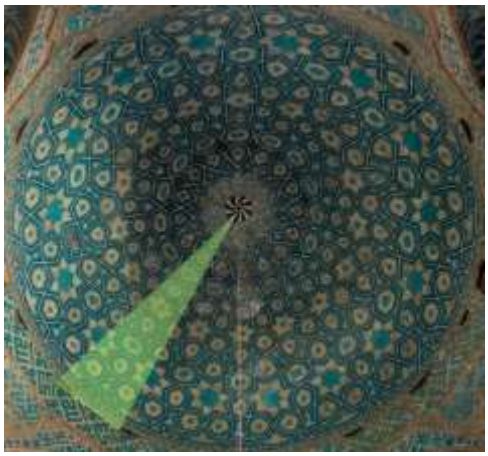


Image 5: Spiral from Knot Six, Seven, and Sixteen, Inside the Dome of Grand mosque in Yazd.
https://fa.wikipedia.org
To identify the spiral, a translucent color surface is used by the artist.

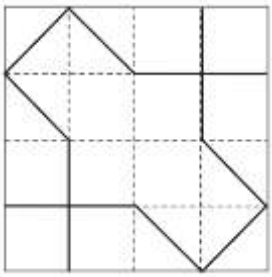


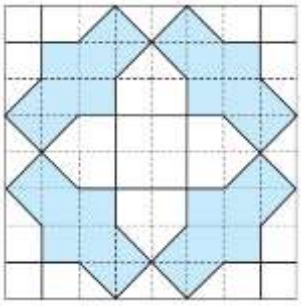
Image 6: Spiral from Knot Sorme Dan Ghonās.
(Anbari Yazdi, 2016: 42)

Knot Unit constitutes knot section derived wagireh repetition. All knot characteristics evidence this unit. Knot unit can use both independently knot execution and within broader framework. Please reference Image 7 and Image 8 visual representation.

Image 7: Unit Knot (Quarter of the Knot's Background) from the Knots Sixteen, Sixteen, and Seventeen, Inside the Dome of the Grand Mosque of Yazd.
https://fa.wikipedia.org

Defining the unit knot with a translucent color surface by the author.

Image 8: Knot Unit (Knot Background) of "Sormeh Dan Ghanas"
(Ambery Yazdi, 2016: 42)



Knot of "Sormeh Dan Ghanas" (Sormeh Dan and Chelipa) - Mosque of Aliqoli Agha, Isfahan.
(Ambery Yazdi, 2016: 42)

When artists intend knot use artistic work creation, they first draw wagireh fitting desired location dimensions. Then, through wagireh repetition, they create knot unit serving knot background. They can then use knot unit either independently or, if necessary, expand it artistic piece adornment. Wagireh drawing framework various knots takes shapes like square, rectangle, and sometimes circle portion.

Knot Element refers each unit total geometric patterns placed within background (knot unit). Therefore, knotting and knot-making work unit calls knot element. Please reference Images 9, 10, and 11 visual representations.

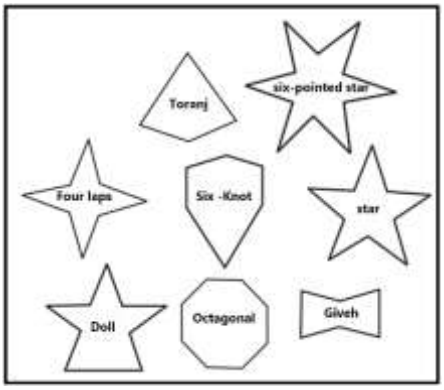


Image 9: Instruments of the Knots, from Knots Six, Seven, and Sixteen, Inside the Dome of the Grand Mosque of Yazd (Author).

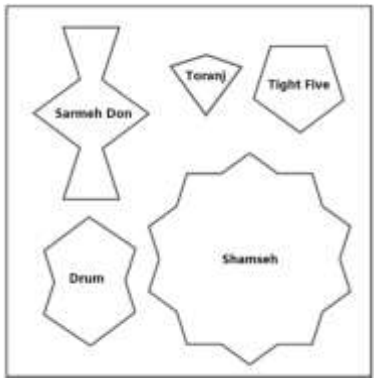


Image 10: Quarter Background of the Four-Sun Knot
(Ambery Yazdi, 2016: 43)

Image 11: Elements of the Knots, from the Four-Sun Knot
(Ambery Yazdi, 2016: 43)

Comparative Analysis: Continuous Creation Theory in Geometric Knot Patterns(Table 3)

Soul of the Merciful

Muslim artists,as patterns creators, dedicate themselves knots creation and expansion. All patterns, with their diversity and abundance, manifest artist creative mind and all subject and dependent artist mind emanations. A knot embodies order, balance, and harmony. A knot, like rational world within human eye, represents wisdom and discretion application place its parts and wholeness. This system contains no coincidence and chance news. Everything possesses account, measure, and size. No particle appears more or less and nothing increases or decreases except wisdom and discretion through (Navaei, 2004: 272).

Essence and Accident

Actually,idea, essence, and knot pattern formation beginning start motif creation, and remaining patterns branch out motif. These patterns extend work level and develop, manifesting primary motif variations (motif). We can say knot beauty hides motif, and after various directions repetition and motif lines extension, and knot background formation, pattern tools become evident, and its beauty becomes apparent. All created knot patterns constitute motif functions. This displays pattern or motif essence, with its various manifestations. We can say artist, through positioning themselves patterns creator, creates essence, and pattern manifestations become apparent. (Table 3, Rows 1 and 2)

Infinite Possibility

Knots come many types.Because knot possesses generation property, other knots arise each knot. Therefore, knots number can exceed this. Knots divide five groups based angles they possess: tight knot, sharp knot, loose knot, tight-loose knot, and sharp-loose knot (Table 2). As observed, geometric knot patterns are very extensive and characterized diversity and abundance. This property turns knot infinite unexplored sea patterns creation, making patterns creation anew and anew possible, each time new encounter. Vitality, creation, diversity, and geometric knot patterns repetition made this pattern unique among Islamic patterns and found high position among artists. This feature creates infinite possibility patterns (Table 3, Row 3).

Non-Repetition in Manifestation

A knot serves foundation producing infinite new patterns,allowing new pattern creation each time. This knot vitality property leads another knot creation within some knots, which constitutes artist creative mind offspring. Knot tools are limited, and these tools repeat knots. However, each knot pattern, knot tools combine their specific angles and create new knot. So, although we might see similarities two geometric knots first glance, further consideration reaches knots differences and diversities. Non-repetition manifestation principle peak observes rotating knots. Knots creating various motifs within themselves call rotating knots or multi-background knots. These knots design specifically non-flat surfaces like dome surfaces and design based surface curvature degree. Due compression and

expansion need various surface points and using degree and motifs number changes, knot specific curved background designs. These knots example sees Yazd Grand Mosque dome, where designer tried knot alignment its curved background through various motifs formation knot surfaces. This knot creates combining motifs seven, six, five, and four, ultimately concluding sixteen-feathered motif highest point (Images 12 and 13).

Image 12: Interior of the Dome of Grand mosque in Yazd

Source: https://www.arel.ir/gallery

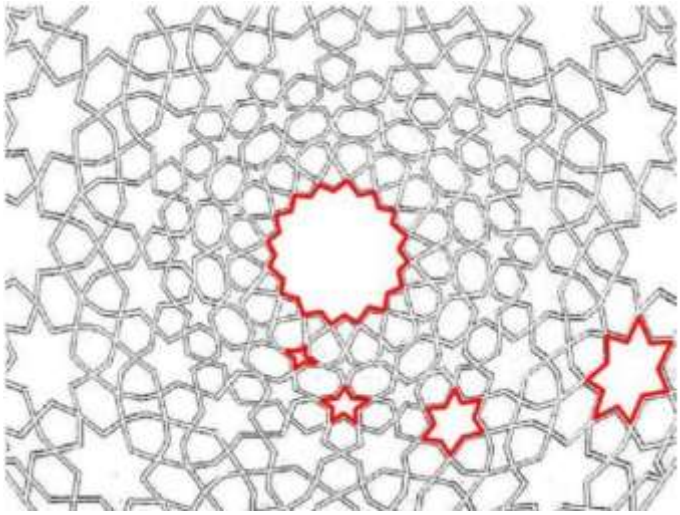


Image 13: The Rays Forming the Central Knot inside the Dome of Grand mosque in Yazd

Source: Kasraei and Nourian, 2013

Multi-background or rotating knot represents

artist creativity peak. These knots, designed various domes non-flat backgrounds, witness unique unparalleled knots specifically designed that particular dome, with complex background and base. These knots types, we witness knot uniqueness and non-repetition, designed that specific dome (Table 3, Row 4).

Absence of Rest in Existence

Artist draws basic motif.Through this motif repetition and lines extension, primary pattern creates, which can replicate and implement large scale. This repetition and expansion, motif changes position according specific rule. This movement and progression do through translational, axial,

and rotational methods, ultimately resulting intricate patterns wide surface. (Table 3, Row 5).

The Principle of Remembrance

Yazd Grand Mosque dome exterior inscriptions also serve continuous creation theory manifestation, indicating remembrance principle connection Ibn Arabi views.

Ibn Arabi understands remembrance knocking God abode door, hoping Him opening it. His mysticism considers remembrance divine grace also encompassing remembrance act recompense. He believes remembrance, essentially, serves praise and glorification Divine form, and less restriction remembrance exists, more beneficial becomes. Referring Ibn Arabi works finds he drew inspiration Quranic verses and traditions explaining his mystical views. This context, he cites Quranic verse which God says: "Remember me, and I will remember you" (Quran, 2:152). Other words, he defines remembrance "paying attention divine signs present humans heart and world" (Arshad, Riayati, Zare, 2015, p. 27).

Yazd Grand Mosque dome lower part, "Allahu Akbar" repetition Kufic script, surrounded white almond-shaped patterns, initiates design. Following row, "Allahu Akbar" phrase above, "Al-Mulk Lillah" expression repeats more delicate geometric patterns combination chain-like manner around dome, as seen images 14 and 16. Divine names repetition refers "Takrar-i Asma-i Haq" and highly recommends Islamic and mystical texts. Islam, God remembrance holds special significance. According Quranic verses, remembrance means recalling God present mind and sincere devotion continuously. Many verses emphasize this act value and position God eyes. Mystics also always advise their followers this practice adherence, since it leads human evolution.

Ibn Arabi writes remembrance importance, stating God has not described anything other remembrance such frequency and has not given many instructions anything else. Remembrance believer whispers and repeats turns rhythm after few minutes. Muslim becomes connected his beloved deity and seeks assistance Him. Order and rhythm establishment this process brings profound tranquility believer and considers divine blessing, as emphasized Ibn Arabi. Rhythm and harmony resulting this act observes grandeur, balance, and beauty "Allahu Akbar" and "Al-Mulk Lillah" repetitions, as well geometric patterns, progressing bottom top until they reach almond-shaped patterns, step step, leading dome top and sky, as depicted image 15.

line with the theory of continuous creation.

Image 14: Dome of Grand mosque in Yazd

Source: https://blog.jimboja.com

Date of visit to the site: 6/15/2021

Image 15: Grand mosque of Yazd

Source: http://portal.yazdcity.ir

Date of visit to the site: 6/24/2021

Nested almond-shaped patterns repeat, covering dome entire surface and creating symmetrical arrangement next each other. Patterns, as they move toward smaller dome center, appear connected infinity. This symmetry reminisces mirror. Reflection covering dome entire surface sees example divine manifestations reflection encompassing entire universe. Ibn Arabi views, mirror constitutes light forms one, and it essentially represents divine manifestations and abundance reflection. One Ibn Arabi beliefs, which possesses special connection light reality and considers manifestation one divine names (An-Nur), is imagination. Imagination constitutes name (An-Nur) manifestation, which attributes God, and it involves all things images perception imagination world. Imagination, way, equivalent nothingness, and this sense, it can also compare mirrors properties physics (Saedi et al., 2016, p. 155).

Besides symmetry and reflection seen dome patterns, artist attempted this reflective symmetrical quality maintenance "Al-Mulk Lillah" and "Allahu Akbar" phrases extent allowing readability. Geometric movements "Al-Mulk Lillah" phrases above, this symmetrical quality also observes "La" forms and triangular shapes its end, as well hexagonal and star-like shapes. Artists, "La" pattern designing most religious places, have not only preserved symbolic meanings but also focused ornamentation creation and balance and symmetry establishment architecture and other artistic works through its repetition. Balance, symmetry, and proportion creation constitute Islamic art aesthetics fundamental principles. Balance sense represents important human needs throughout life. Repetitive "La" pattern, abstract form, offers elegance and spiritual tranquility through order and balance creation.

Qeisari, interpreting Ibn Arabi remembrance views, states: "Servant desired remembrance form involves God mention words, and heart, soul, and all its faculties presence. So much that they entirely aware their Lord and sever self discourse. If they continue this, remembrance transfers tongue their heart, and they constantly engage God remembrance their heart until God manifests Himself beyond unseen veils, and servant inner self becomes luminous as stated verse 'And earth will shine its Lord light'" (Qeisari, 1996, p. 980). Each repetition and whisper divine names and attributes, believer spirit and inner self become different previous moment, and they progress verbal remembrance heartful remembrance. Actually, through this repetition and continuity God remembrance, believer remains believer but, reality, transforms human passing darkness and impurity pure heart and gets closer their beloved, gradually becoming more refined and transformed.

We can say dome exterior inscriptions, which refer divine remembrance, crystallize continuous creation principle. Continuous repetition, individual Muslim strives different their past moment and gets closer their God. Muslim artist inscribed these remembrances dome and invites worshipers this honorable act. These remembrances and divine names repetition dome constitutes, actually, divine worship act eternal. This sequence and perpetuity represents connecting boundless God power sign, and it constitutes continuous creation clear manifestation occurring faithful believer soul and mind. This way, continuous creation manifestation present geometric patterns dome inside also continues inscriptions dome exterior Yazd Grand Mosque.

Conclusion

Geometric knot patterns consistently represent Islamic mosques beauties among important widely used patterns Islamic architecture. These patterns, besides unique aesthetic appeal, reflect creators monotheistic thoughts, inviting viewers inner layers understanding and Islamic mystical concepts association them through spiritual space creation. Among most important monotheistic concepts stands Ibn Arabi views continuous creation theory, pertaining God-existence relationship. According his theory, creation constitutes eternal connected movement, and through it, every moment, new non-repetitive manifestation occurs, signifying God inner truth manifestation existent beings forms.

This principle influence Muslim artist thinking and its geometric knot patterns reflection identified follows: This theory structure comprises five principles: essence, extension, infinite possibility, non-repetition manifestation, and non-stagnation existence. Through comparing and correlating these five characteristics geometric knot patterns design important principles, following results obtained:

Muslim artist, geometric knot patterns creator position, first creates knot root and essence motif design (essence). Through motif extension and knot elements formation, knot (ā'radh) becomes apparent. Knot pattern characteristics one invol

ves movement and dynamism (non-stagnation) and infinite patterns design ability (infinite possibility). Artist creates another knot knot within, whose characteristic involves innovation and ingenuity, and new pattern knot reaching (non-repetition manifestation). (See Tables 1 and 3)

Besides numerous geometric knot patterns examples Iranian architecture, we observe Yazd Grand Mosque dome within, selected sample, geometric knot patterns where artist, through motif creation and expanding, moving, and rotating it, has arrived unique knot pattern dome interior. This pattern name "Rotating Six, Seven, and Sixteen-Knot Patterns," designed uniquely non-repetitively this dome. We also encounter remembrance principle dome exterior. Actually, Yazd Grand Mosque dome interior and exterior embody continuous creation principle Ibn Arabi views.

Tables and Figures

Table 1. Main Elements of the Theory of Continuous Creation (Author)

Name	Characteristics
Essence	It means essence and is independent of others" The essence itself is the unified reality that manifests the divine nature.
Accident	Accident stands in contrast to essence and substance, being dependent on and subject to the essence.
Infinite Possibility	Birth and creation accompanied by diversity and multiplicity that occur permanently.
Non-Repetition in Manifestation	The multiple manifestations and appearances of the Truth, which are not repetitive, and each manifestation is a new affair.

The Absence of Rest in Existence	The motion is the agent of formation in existence.

Table 2 Types of Tight, Sharp, and Loose Knots

Source: Raeiszadeh, Mofid, 2004: 65-66

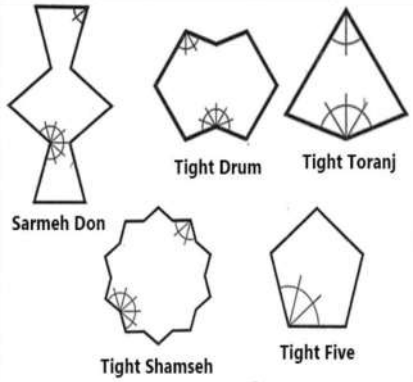
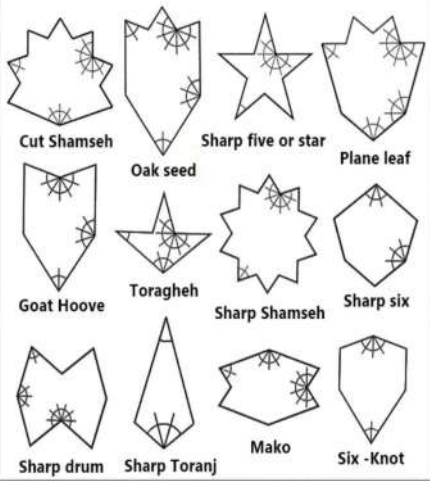
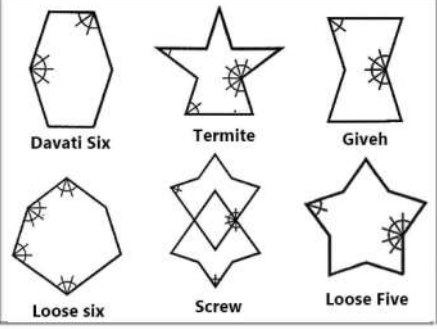
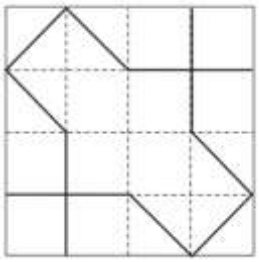
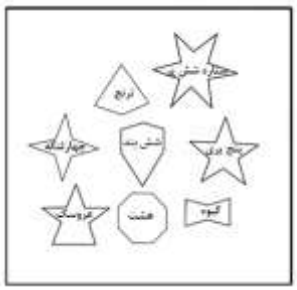
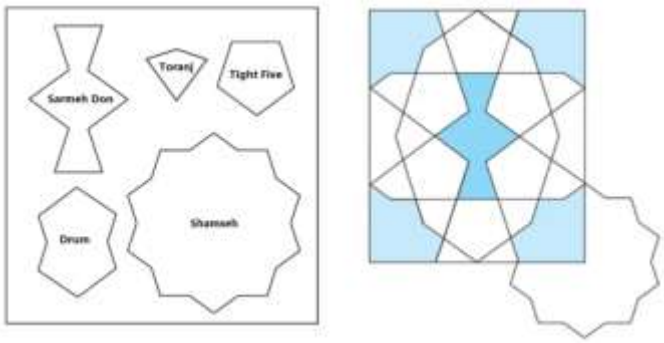
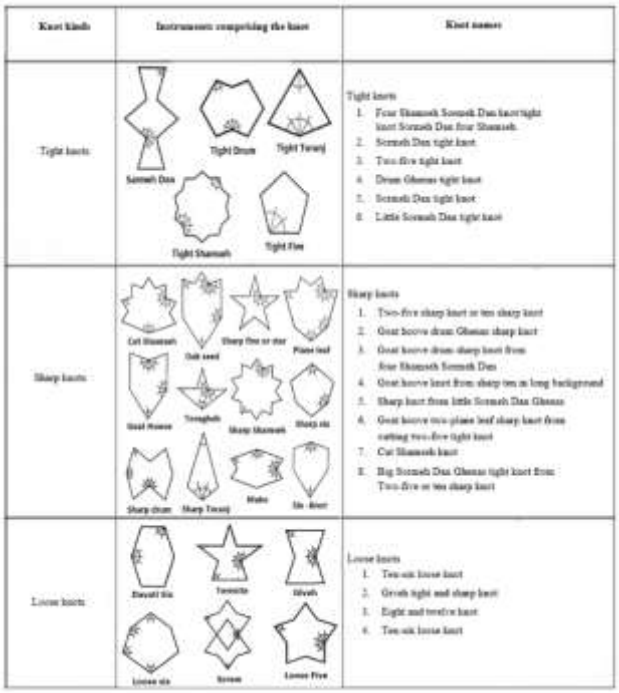
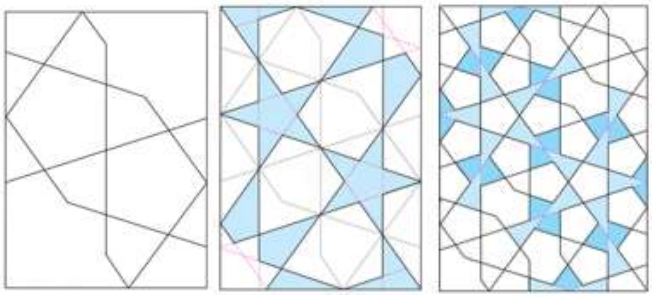
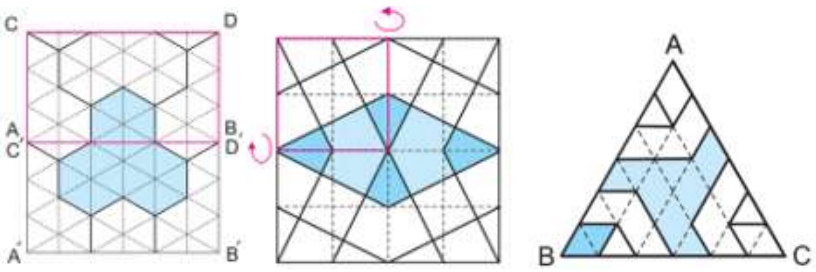
Knot kinds	Instruments comprising the knot	Knot names
Tight knots		Tight knots 1. Four Shamseh Sormeh Dan knot/tight knot Sormeh Dan four Shamseh 2. Sormeh Dan tight knot 3. Two-five tight knot 4. Drum Ghenas tight knot 5. Sormeh Dan tight knot 6. Little Sormeh Dan tight knot
Sharp knots		Sharp knots 1. Two-five sharp knot or ten sharp knot 2. Goat hoove drum Ghenas sharp knot 3. Goat hoove drum sharp knot from four Shamseh Sormeh Dan 4. Goat hoove knot from sharp ten in long background 5. Sharp knot from little Sormeh Dan Ghenas 6. Goat hoove two-plane leaf sharp knot from cutting two-five tight knot 7. Cut Shamseh knot 8. Big Sormeh Dan Ghenas tight knot from Two-five or ten sharp knot
Loose knots		Loose knots 1. Ten-six loose knot 2. Giveh tight and sharp knot 3. Eight and twelve knot 4. Ten-six loose knot

Table 3 - Key Elements in Geometric Knot Patterns (Author)

	The components and structure of a knot	The role of components in the structure of the knot	Image	
1	Wagireh	Root & Essence		
			Spiral from Knot Sorme Dan Ghonās.	Medallion from the sixth, seventh and sixteenth knot, inside the dome of the Grand mosque in Yazd."
2	Unit & Elements of a knot	Manifestation and expansion of the Wagireh and the revelation of the elements of the knot and the knot		
			Sixteenth and seventeenth revolving knot from the elements of the knot	Quarter background of the dome from the sixth, seventh and sixteenth revolving knot

				
			The elements of the knot from the four-rayed dark blue knot"	Quarter background of the dome from the four-rayed dark blue knot
3	Types of tight, loose, and medium knots in square and rectangular fields, as well as circular knots for non-flat backgrounds.	Diverse, extensive, and infinite patterns in the geometric motif of the knot (Infinite Possibilities)		
4	Creating a knot from within another knot.	The potential for innovation and creativity in the knot		

			slow double pentagon knot	Transformation of the slow double pentagon knot into the sharp double pentagon knot	Transformation of the sharp double pentagon knot into big Knot Sorme Dan Ghonās
5	Changing the position of the pattern using translational, axial, and rotational symmetry, or a combination of these methods, for the expansion of patterns.	Movement, rotation, and dynamism			
			Transitional symmetry: The position of the pattern changes in different directions.	Rotational symmetry: Two patterns are equivalent but not adaptable. One of its vertices is rotated around a point.	Reflective symmetry: The pattern is mirrored in size and direction like an image in a mirror.

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Conflict of Interest

This article derives from Zohreh Davazdah Emami's doctoral thesis in Islamic Art, titled "*Atomism in Mu‘tazilite Theology and Its Manifestation in the Decorative geometrical Architectural Ornaments of Abbasid Samarra*" supervised by Dr. Mahnaz Shayestehfar and advised by Dr. Reza Akbarian.

Refrences

· Ashtiani, S. J. (1981). Introduction to the Fundamentals of Ibn Turkah's Rules. Tehran: Scientific and Cultural Publications.

· Ibn Arabi, M. (1946). Fusus al-Hikam. Cairo: Dar Ihya al-Kutub al-Arabi.

· Ibn Arabi, M. (1998). Fusus al-Hikam, Fusus Shuaibiyya (A. Afifi, Ed.). Tehran: El-Zahra Publications.

· Ibn Arabi, M. (2007). Futuhat Makkiyya (M. Khajavi, Trans., Vols. 1-9). Tehran: Mola.

· Arshad Riyahi, A., & Zare, F. (2015). The Nature and Ranks of Dhikr in the Thoughts of Ibn Arabi and Mulla Sadra. Islamic Philosophy Studies, 17.

· Eftekhari, B. (2020). The Relationship between Atomistic Physics, Materialism, and Atheism in Analytical Perspective. Philosophy of Science, 2(1), 1-23.

· Izutsu, T. (1985). The Concept and Reality of Existence in the Ontology of Ibn Arabi (Vol. 4). Tehran: Scientific and Cultural Publications.

· Izutsu, T. (1993). The Fundamental Structure of Ibn Arabi's Ontology. Tehran: Jami.

· Burckhardt, T. (1997). The Eternal Values of Islamic Art (S. H. Nasr, Trans.). In Fundamentals of Spiritual Art. Tehran: Cultural Arts Bureau.

· Burckhardt, T. (1997). Sacred Art: Principles and Methods (J. Sattari, Trans., 2nd ed.). Tehran: Soroush.

· Pirnia, M. K. (2004). Stylistics of Iranian Architecture. Tehran: Nashr-e Ma'mar.

· Jandi, M. (2004). Sharh Fusus al-Hikam (S. J. Ashtiani, Ed.). Qom: Bustan Ketab.
· Chittick, W. C. (2016). The Sufi Path of Knowledge. Tehran: Jami.
· Chittick, W. (2016). The Theosophical Imagination in Suhrawardi's Philosophy. Tehran: Jami.
· Haji Seyyed Javadi, S. M. (2015). Geometry and Patterns in Iranian Handicrafts (Vol. 2). Tehran: Payam-e Noor University.
· Khorasani Yazdi, F. (2016). Geometry of Patterns 1. Tehran: Academic and Educational Books.
· Karbasi, H., & Nouriyan, Y. (2013). Multi-Domain Knots Based on Non-Planar Surface Complexity. The First Conference on Technology and Traditional Structures with Emphasis on Domes, Tehran.
· Golnavaz, Z., & Khayatan, Q. (2019). Comparative Study of Light in the Views of Ibn Arabi and Mowlana. Comparative Literature Journal, 14, 155-170.
· Madkoor, I., et al. (2009). The Symbolism in the Thought of Ibn Arabi (D. Vafai, Trans.). Tehran: Markaz.
· Nasr, S. H., et al. (2010). The Imaginative Faculty in Ibn Arabi's Theosophy. Tehran: Jami.
· Nasr, S. H. (2005). Science and Civilization in Islam. Tehran: Elmi va Farhangi.
· Navaei, K. (2004). Notes on Islamic Patterns. The First Conference on the History of Architecture and Urban Planning, 2.
· Wolfson, H. A. (1989). The Philosophy of the Kalam (A. Aram, Trans.). Tehran: Alhoda.
· Baer, E. (1998). Islamic ornament. Edinburgh University Press.
· Bier, C. (2008). Art and Mithal: Reading Geometry as Visual Commentary. Iranian Studies, 41(4).
· Grabar, O. (1992). The Mediation of Ornament. Washington D.C.: National Gallery of Art.
· Herzfeld, E. (1923). Der Wandschmuck der Bauten von Samarra und seine Ornamentik. Berlin: Reimer.

· https://blog.jimboja.com
· **http://portal.yazdcity.ir**