



Analysis and Study of Geometry of Persian Carpets with Geometry and Architecture Approach

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Abstract: Persian carpet and architecture are an integral part of Iran's culture and civilization, which have long enjoyed a special status in this land. With careful attention to the works of the Persian carpet of the Persian carpet from the past to the present day, there are many common points of interest between them. The main objectives of the present research are to first examine and introduce the two introduced elements, namely Persian carpet and architecture, separately, and then the link between them in design, meaning and geometry, in the following, to introduce the common points between these two concepts and their relationship. With geometry that has existed from the past and has evolved to today, examples of further understanding of these links have been highlighted. It is hoped that such studies could be useful for the enthusiasts of this pathway in the field of architecture and its common arts, including carpets.

Keywords: carpet, Iranian architecture, carpet and architecture, geometry and carpet

INTRODUCTION

The history of the carpet is with its own history. Throughout the centuries, Bashrulyyeh had been familiar with the method of tufts of plant fibers and bark, and, consequently, of industries such as baskets, and using wool of animals that had the potential to live in the early societies, could produce non-softening layers. (Lolui and Asadi, 2014). His art is a weaving of a native Iranian art and has always enjoyed a special status on the international level.

Iranian carpet as the most important and most valuable handicrafts of Iran, has always been known as the glory of Iran, in other words, it has the largest share in the identity of our land, so that its name in all of the world is named after the country of Iran and is associated with the culture and life of the people. This land has become unbreakable. (Mistaghi and Zarrin Qulmi, 2015) Undoubtedly, the architecture and carpet weaving have an unbreakable relationship with each other.

Encyclopedia has always been one of the inspirational sources for designers of unique Iranian carpets. The images of life full of recklessness play on the dimensions of space. From the ceiling, it slips over walls and walls, and this way, the extract of treasures of Iranian arts in the same variety,

together, creates a unity of space. (Misaghi and Zarrin Qalmi, 2015) So, between Iranian noble arts, architecture and carpet are most interacting with each other. On the other hand, the carpet is an integral part of Iranian architecture and has long enjoyed a valuable place in the fields and houses. In the past, the usual length of time to determine the dimensions of the room was as large as the size of the carpet, and in accordance with the dimensions of the space, they were more focused on the dimensions of 2×3 and 2.5×3.5 and their magnitude. (Image 1)



Image 1: The dimensions of the room are equal to the size of the carpet (Amini, 2006)

Carpet

Carpet is one of the most important symbols of taste, art and soul of the beauty of Iranian society. The abstract and charming designs of traditional Egyptian traditionalists and amphibians are not merely a colorful vinyl to fill an empty space, but each line and color in every twist and turn is a symbol of the meanings and concepts of the Eastern world, especially of Iran. (Safari, 2011) The Arabic word "carpet", which is said to be in the Pahlavi language, is the same as the broad or expanse that propagates on earth, such as "earth", whose intrinsic traits are expanded and mature And giddy. Give calm to the carpenters. On the other hand, the earth is a picture of the sky, and the earth's effect has a heavenly origin or a picture of it. Therefore, the carpet is mirror of the throne. Everything on the carpet has a mystery of the sky. But in the term, it is said to be called "sapling" and "carpet" in the Persian Encyclopedia of Persian, which is called "Tapestry" in Latin.

Baharestan's carpet is one of the oldest Persian rugs. Baharestan's carpet is also known as the Bahar Khosrow carpet and the Carpet Basir Kasra. Baharestan's carpet is placed on the vault of the Kasra Palace, and its length is 140 and the width is 27 meters, which is considered a large carpet. In the texture of this carpet, they have used expensive materials such as gold, silk, silver, emerald and pearl. The design of the carpet is very similar to Iranian gardens, which stretches along wide rains along the length and width. In the vicinity of water rivers, they have designed sidewalks; rivers are small and look like water jets. One of the interesting things about the design of this carpet is related to the streams and streams that are sewn up with crystal clear jewels, and when you see it, you feel clear, clear water. Beside the sidewalks that are designed in Baharestan, beautiful gardens are designed. These gardens are designed with the use of expensive green gems that look like a manure (Image 2). Inside the gardens, trees are also designed that have roots of Zarfam; the flowers, fruits and buds of this carpet are also designed in a special way. It has been said that the nature of spring

is on you. The edges of the carpet are widespread and have their own design and are decorated like a garden. In a number of gardens, billets and tablets of gold, like the soil, cover the gardens. Baharestan's carpet was looted by Arabs as a booty for the Arabs, and was scrapped by them and sent to Omar. (Tabari, 1982)



Image 2: Left side, arches, right side, Baharestan carpet. Authors' references



Iranian carpet design




Symbolism and decoding are the hallmarks of the Persian carpet, which is usually based on geometric discipline and its regular geometry. The determination of the Persian carpets is made up of a quadrangle or rectangle, which is matched with four main directions and four ancient climates, the base of the square of the Ka'bah and the Muslim mosque. One of the most important principles in Iranian carpet is the principle of symmetry, which is shadowed by balancing its design, avoiding perspiration and using the linear depth region "a two-dimensional method" as a model for its designers. The aesthetics of escaping from the vacuum as well as the particle is predominant. (Mohandsey and Kashmiri, 2015)





Carpet Types and Dimensions

In Iran, the classification of carpet titles is usually determined by size and size as described in Table 1.

Table 1: Types and Dimensions of Carpet Writers Reference

Number	Name	Dimensions	Description
1	Carpet 	$2 \times 3 - 2.5 \times 3.5 - 3 \times 4 - 3.5 \times 5$ $- 4 \times 6 - 5 \times 7 - 6 \times 10$	Carpets are said to have carpets with a surface area of more than 6 square meters.
2	Kalge 	$3 \times 1.5 - 3 \times 1.70 - 2 \times 3.5$	It is commonplace among nomads.

3	Side carpet 	The width is 70 to 110 and the length is 2.5 to 8 meters.	Used for stairs and corridors.
4	Rug 	1.40×2.20	Small carpets
5	Curtain 	1.5×2.5	This type of carpet is installed in the door or hallways.

6	ZARA and Half 	80×156	The size of Persian Persian is 104 cm. Adding half to the scale ($156 = 52 + 104$) The length of the carpet is 156 cm.
7	ZARA and Charek 	80×130	It is mostly woven in the Persian parts of Iran.
8	Cushion 	$90 \times 60 - 120 \times 60$	Its width is from 50 to 80 and its length is 80 to 120 cm.
9	Door-mat 	70×50	The size of the parachute at the entrance

Persian carpet and architecture link

Among the positions of the emergence of symbols in Iranian art is the architecture and design of the carpet. The most direct and immediate relationship between man and form can be found in art, architecture, the most direct and most direct symbolic form. (Image 3) The aesthetics of Iran's carpet is also influenced by symbolism. The theme, like the Mirror of the Throne, is a reflection of pictorial designs and symbolic roles inspired by the carpet's human beliefs, thoughts and aspirations. It should be noted that the Iranian artists, and especially the decorators, have never been repeated in

the cycle of repetition and imitation in the process of continuing the artistic achievements of the predecessors, meaning that the continuation of Iranian art has never been considered as a matter of rest. (Mohandsey and Kashmiri, 2015) Architecture An Iranian with a rich taste of paintings, and by combining these elements, creates works in the form of painted tufts and outstanding craftsmanship, which is the result of his efforts of sources that the design of carpet affected by it Makes In general, it can be said that general or partial art is one of the sources of inspiration for designers of unique Iranian carpets. What can be seen in the architecture as the architectural details and initiatives of the architect at every corner of the Iranian building can be seen in the carpet in the form of rich and varied designs that flow through the mind and the hand weaver on the carpet. (Misaghi and Zarrin Qalmi, 2015). The pure aspect of the Persian carpet's beauty and artistic style has become apparent in the design and role of carpet, obviously, undoubtedly a mysterious world of aesthetic and literary culture of Iranians. Before the advent of Islam, carpet crafts and other handicrafts of Iran were derived from the role of man, animal and nature, but with the advent of Islam, simulation was prohibited, and for this reason, carpet designs using stylistic and geometric patterns Includes coding and mentioning. Flowers, trees, animals and birds are designed in the form of the same stylization and various geometric shapes such as rhizome, trapezoid, octopus, or the planet of these flowers and trees in their breasts, coincidences And the order of roles. (Mistaghi and Zarrin Qulmi, 2015)



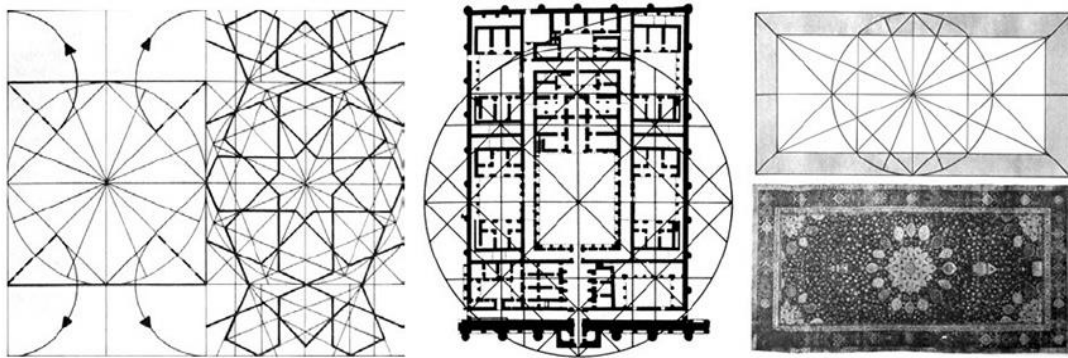
Image 3: Persian carpet and architecture link, Writers Reference

The basis of Iranian architecture

Geometry and proportions are the foundation of Iranian art and architecture. In Iranian beauty, beauty is nothing but a balance and balance of the proper members of the building and the use of the decorations that come from the foundation and is presented logically. An admirable building to be seen at its height and desirable decorative lines. Historical analysis of many Iranian monuments has proven that in Iranian architecture, the full knowledge of proportions, especially golden proportions, has been widely used. Iranian aesthetics. (Mithaghi and Zarin-Qulmi, 2015) Geometry and Computation is the common point between carpet and architecture. Aristotle states: "The beauty is ultimately fit". As the Brotherhood puts it, in the geometry dissertation: "the universe was created based on geometry, weight, quantity, and count". And so that Iranian art with The creation of each source is the source of creation. What we call the art of unity and plurality, and the stepping step closer to God's meeting. (Moelmey, 2014)

Geometry and carpet

Since, according to many scholars, the basis of Islamic-Iranian art was geometry, and in the pre-Islamic period, the art of Iran had no geometrical structure, it can be guessed that the carpet was considered to be the point of appreciation of Islamic-Iranian art based on A large geometry is formed. The results of the studies show that designers in the past, considering geometry as the main basis for the design of rugs, plotted the drawings into a bed of geometry. The geometric analysis of the carpet can be divided into layers. Parts that are aligned like layers and surfaces or multiple alignments, resulting in a combination of them, creates the final design. (Image 5) The development of the design in the carpet is based on symmetry and fit and based on the consistency of the size, shape and relative position of the components in general. Geometric patterns in the carpet, like spatial designs, require patterned and raster patterns "on the whole surface". These chess patterns are the contours that grow side by side. This is a math that can not be used to cover a 360 degree surface of its angles, except three polygonal triangles, squares, and octagons "made up of two rotated 45 degree squares". These three polygons that cover a flat surface include only three possible regular grids: diagonal, vertex, and mastier. (Mistaghi and Zarrin Qulmi, 2015) (Image 4)



Right: geometric analysis of the tomb carpet of Sheikh Safiuddin Ardebili based on the division of eight

Middle: Geometric analysis of the palace palace in Syria based on square and rectangular

Left: A geometric analysis of a Chinese node based on the division of eight (Image 5)



Geometry and carpet , Writers' references(Image 4)

Module and Peyman

Peymon is in fact the same modular or modular design, for ease of operation and directing to all sizes. Peyman was a small and small size that was used wherever it was needed. The architects used

the Pimon and its repetition in sizes and organs, making the buildings very different. None of the two works was the same, and each had its own characteristics, although one of them was followed. (Pirnia, 2008) There are different modules in Iranian carpets, despite the repetition of carpet maps, there are no similar carpet dusts and the repetition of the carpet modules is possible to cover large spaces in numerical sequencing. For example, a space of 24 square meters of 6×4 is really suited to two-dimensional 3×4 or four 3×2 carpets. (Image 6)



Image 6: To the right, the carpet of Slymi - left, the tomb of Amir Ismail Samani. Writers' references

Persian Garden Garden Geometry

The carpets and gardens of Iran are old and twin bonds. What connects these two arts has many dimensions. The similarity between carpet and vagabond in its literal sense follows the common geometry, color scheme, and the area of the micro flush. In the carpet and garden, the perimeter strips are considered as enclosures, the central element, the valley, or the pond or the intersection of roads leads the eye to an intermediate point. (Image 7)

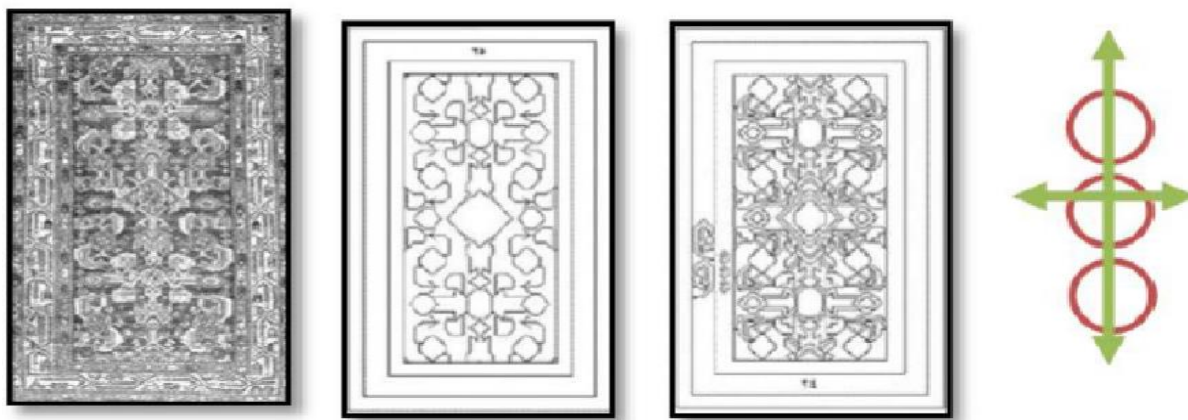

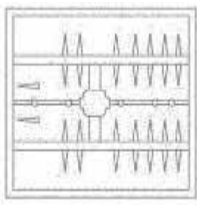





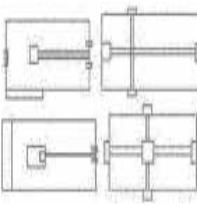


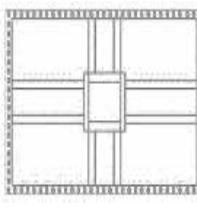


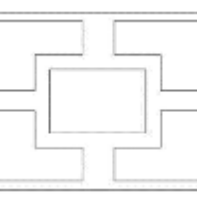



Image 7: Reflection of Persian Garden Geometry with Ribbons of Writers

Basically, the Persian carpet is more of a garden than the carpet, with the distribution of the central pond, these masses (garden), which are ultimately beautifully decorated and decorated with flowers decorated with animals and symbolic characters, are dispersed in various frameworks. Persian carpet is a moving garden in space. (Nouri and Mafakher, 2011)

Table 2: Common geometry in Persian garden and carpet Writers

Number	Carpet	geometry of carpet	Persian garden corresponding to geometry of carpet
1			 Finn Garden
2			 Eram Garden
3			 Eight Paradise of Gardens
4			 Golshan Garden
5			 Thousand Jerim of Garden

Herbal designs (Slamy) and their influence on architecture

The connection of green nature with architecture has always existed in Iranian architecture inspired by nature and vegetarian motifs, including in monuments such as palaces, mosque altars, shrines and so on. . . It is observed. Spiritually and emotionally, the characteristic of the spiral or slalom curve, is the achievement of unity and the full meaning. In essence, the Slavic is as a natural and degraded spiritual realm to the degree of sense. Rhythm, internal and external proportions of equilibrium and balance of flowers and leaves, unity of movement and forces that align with all their diversity and direction. Unity in plurality is another indicator of these designs. Slavic designs are used in various decorations of architecture "including Mogharnas", plastering, tiling, carving, metalworking, gilding, carving, carpet weaving, weaving, pottery, crocheting, book decoration, miniature and calligraphy. From ancient times to the present, all the decorative motifs and forms

inspired by flowers and plants in nature, as well as inscriptions used as decorations and formed in the Islamic East, use the word slavic. With the start of the Islamic era and the ban on the creation of human and animal pictures in the decorations, the attention of Muslim artists to the design of flowers and plants as decorations in works and objects "was increased and gradually, with the supremacy of Islamic art, the drawings of these designs were made in the form of contractual drawings. (Image 8)



Image 8: Right side of the carpet with a slalom - left, altar of the mosque of Uromiyeh Source: Authors

Lilies

Niloufar flower, in addition to the shape found in the palm trees and palms of Persepolis, has another pink that has been transformed into mud for centuries by the name of Tulip Abbasi, the Niloofar flower facing from the face of a symmetrical and centered form, The crocheted petals are as if the guard and the guard is an object. Many crocheted petals are a symbol of two fish and the center of the flower is Mitra, brought to the ground by two fishes. This design is abundant in pots, fabrics and ... (Image 9)



Image 9: Highlights of the Pars Town (Persepolis) Writers' Reference

Cedar

In the ancient mythology it is said that the tree is endowed with the sun and therefore on top of the symbol of the cedar in the old monuments of the sun symbol is located in the main axis of Iranian gardens more than the row of cedar and shrine. In the beginning, it is a holy tree, a religious, and a religious tree, and a piece of khorrami, always spring and masculine. The second phase of the simultaneous infiltration of Islamic civilization, the cedar is separated from the ancient roots and turns into an ornamental pattern and goes away from its religious nature. From here, the cedar is simply depicted in a jute and closer to an ornamental picture. In addition to the fact that the cedar is portrayed naturally, it is abundantly used in the form of beaded bracelets, as a combination of motifs and individually. In addition to the altar, minarets and figurine pillars are symbolic of the tree. Among the similarities between the element of the minaret in the mosques and the cedar tree in the architecture and the mahrabi carpets, the minarets in the architecture and the tree in nature, the elements derived from the earth and in the pursuit of the sky and the display of reference to the world are higher. (Image 10)



Image 10: On the right, carpet with a serpent - left, southern plain of Persepolis. Writers' references

Effect of the art and drawings in carpet

This design is considered to be a large-scale geometric pattern. It turns out that there are several squares on each other. One of the features that makes it so much used in architecture is its expandability and capability. From the ancient monuments of Sassanid, where Shamses were used, one can mention the architectural structure of the hills of Damghan Valley, Dahshahr, Taq Bostan and Caisson's palace, and the post-Islamic period in the bricks of the mosque of Varamin and Gonbad-e-Sultaniyeh (Ilkhani) Some examples of it are found in the carpet, bergamot (shams) as the symbol of the sun and the sun, and the meaning of the sun in the mystical meaning is the result of divine manifestations. Therefore, it can be regarded as a symbol of divinity and unity. (Image 11)

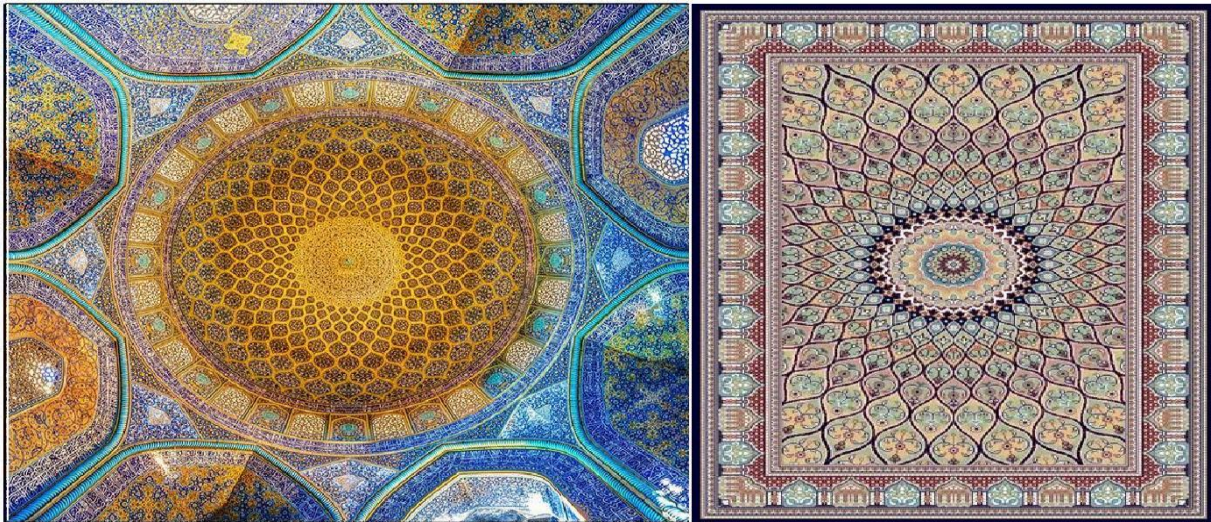


Image 11: To the right, the carpet with the design of the candle - left, the dome of the mosque of Shaykh Lotfollah, the sources of the writers

Conclusion

In this research, a study was made on the relationship between carpet and architecture, which first examined the definition of the word "carpet", the history, dimensions and structure of Iranian carpet design. Carpets and architecture are both authentic Persian arts, which, from the designing of the architectural space to the design, the roles and decorations between them, all represent the unbreakable bond between the two of the past to the present day. It is possible to conclude; there is a great deal of connection between the carpet and the architecture, and in this research we tried to highlight the most important and briefly discussed. The main thing is the sharing of these two arts of geometry. This feature plays a very important role in architecture, while architecture is the source of inspiration for designs and carpet designs, so geometry has been among the main elements of the two arts. The results of this study, what can be presented as a suggestion, is that it is important to try to preserve original arts such as Persian carpets and architecture, especially in the present, with the progress and movement of the world; Let these arts go into oblivion; on the other hand, sharing between architecture and carpet shows the strong bond between the two arts from the past to the present day and we must try to keep this eternal heritage for future generations.

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