

Analyzing the Role of Practical and Perceptible Geometry in the Architecture of the Soltanieh Dome

Abstract

Geometry has had a special place in Iranian architecture (both before and after Islam). Basically, the purpose of using geometry in architecture is to develop and expand the forms and expressions taken from nature to improve the matter and express the principles and ideas that were considered sacred in their essence. In the period of Iranian-Islamic architecture, the main goal is to reach perfection (the absolute unity of existence). Geometry can also be effective as a tool to improve the quality of the building and understand the meaning and concept of architecture. The present research method is descriptive-analytical. A set of indicators based on documentary and library studies as well as analyzes for geometry, in two reasonable parts, including code, symbol and tangible geometry, including quantitative and qualitative aspects to analyze its role is considered in the architecture of Soltanieh Dome. The results of the research confirm that reasonable geometry in the structure of the dome by using codes (numbers) and symbols (shapes) create the most expression in the physical-spatial part. Also, the existence of rules and features (qualitative and quantitative aspects (sizes)) of tangible geometry, including symmetry, balance and coordination have made the materials and resources used in the tangible and material aspects to be improved and the dignity of the ability to transfer meaning to increase.

Research aims:

١. Considering and exploring the position of geometry in Iranian architecture.
٢. Examining the characteristics of qualitative and quantitative aspects of perceptible geometry, including symmetry, balance and harmony in the Soltanieh Dome.

Research questions:

١. What is the purpose of using geometry in Iranian-Islamic architecture?

۲. What is the role of qualitative and quantitative aspects of geometry in the architecture of the Soltanieh Dome?

Keywords: sensible and functional geometry, Iranian architecture, Soltanieh Dome.

Introduction

Iranian architecture has constantly placed a distinct emphasis on beauty; For this reason, geometry is used as a powerful tool by the architect to express the character of numbers, patterns, proportions and other aesthetical values in order to better present the exquisiteness of artworks. On the other hand, geometry has a strong presence in all physical structures, including the components of houses and even cities, and in this geometrically regulated space, every object can find its required limits and dimensions to enter the universe. Considering the architecture of the past periods of Iran, which has always been rich regarding the use of precise drawing methods, knowledge of the rules of mathematics and drawing, as well as the application of special types, have been the duty of every architect; therefore, it is clear that geometry in Iranian architecture has a superior standing. The use of geometry in pre-Islamic architecture was a tool for the development of forms derived from nature, principles and beliefs that were considered sacred in their essence in every era. With the arrival of Islam in Iran, Iranian architecture created a real meaning in the creation of the works by preserving the general principles and previous patterns; thus, the ultimate goal was to reach the absolute unity of existence, that is the presence of God. Therefore, the architects throughout the history of Iran after the arrival of Islam, with knowledge and awareness of the basic Islamic rules and principles, attempted to reveal the true face and meaning of the truth in the design of their works.

Considering its semi-abstract state, which is undisclosed in both the world of matter and meaning, geometry basically contains a reality for better understanding which is determined through interpretation and leads man to the world of analogies and allegories to the stage where the truth is finally revealed and in this path, the thinking mind emerges from the senses to comprehensive intellect and from the appearance to conscience. Now, in this research, the authors, by examining the architecture and physical-spatial structure of the Soltanieh Dome as one of the most prominent works of the Ilkhanid period, seek to answer the question that what aspects of reasonable and

tangible geometry are present in the creation and semantic order of this valuable work and what are their roles?

The current research is based on descriptive-analytical method and in order to obtain the theoretical foundations of the research, that is information related to geometry, library and document method has been used, next, the content analysis method has been used to interpret and evaluate the aspects of practical and tangible geometry; and finally, the obtained results have been evaluated in the study sample.

Many books and researches have been published in the field of geometry mostly focusing on the practical and theoretical attitudes of geometry and in relation to what it is; however, less has been mentioned about practical and perceptible geometry, which refers to the way and manner of creating a role in architectural buildings. Research studies concerning the topic under study can be mentioned including: Nadimi (۱۹۹۹), in the article "Truth of Role" with a brief look at the qualitative and existential aspects of geometry as the language of existence and art and the semantic relationship between geometry and reality, reveals the mystery and amazing characteristics of the examples of shapes and motifs in Islamic architecture. Pope (۱۹۹۹), in the book "A Survey in the Art of Iran" refers to the skill of the Iranians and the tenacity of the Iranian spirit in the form of works of art and states that geometry and mathematics were tools to convey the concepts of the world of meaning; also he believes that the communicative bridge between the tangible and sensible world is through a wide combination of forms. Najib-oglu (۲۰۰۰), in the book "Geometry and Decoration in Islamic Architecture" discusses the role of geometry in Islamic architecture in detail and at the same time criticizes the ideas of philosophers in this field. In his critiques, he diligently attempts to express the possibility and necessity of geometry in Islamic art. Ardalan (۲۰۰۲), in the book "Hess Vahdat" discussed the role of tradition in architecture and obligated a sublime attitude towards art and believes it as timeless. In the book "Theoretical Foundations of Architecture", Aggkar-kar (۲۰۱۳) deals with the subject of geometry and proportions from the point of view of sages and thinkers, and with his wise attitude, he combines the views of Akhwan al-Safa and divides geometry into two practical and theoretical parts, and explains the space from the perceptual perspective analysis and expresses the effects of geometry on humans and the levels of the soul and human perceptual tools. Balkhari Qahi (۲۰۱۶), in the book "Geometry of Imagination and Beauty", criticizes the views of Akhwan al-Safa regarding

geometry and imagination in his treatises. The view of Akhwan al-Safa, which was more influenced by the Pythagoreans, investigated its mystical aspects about geometry, and also considered geometry as the middle link between wisdom and art and divided it into two parts, rational and sensory geometry; also they determined that sensory geometry is the knowledge of values and meanings that are obtained from measurements and consider intellectual geometry to be the cause of knowledge and understanding. With these interpretations, the present research aims to examine the practical and perceptible geometry in the architecture of Soltanieh Dome with a different perspective.

Conclusion

Geometry is one of the most important concepts in architecture, which implies the proper relationship between components and the whole work; moreover, it is also significant in creating visual beauty and providing the possibility of transmitting sublime concepts in architecture. According to the polarity diagram of geometry in the dual realm of abstract and material, it was determined that geometry has a mediating role in the hierarchy of creation. This is a proof of the main use of geometry to convey sublime concepts. Of course, one can find traces of the architect's efforts to use all the quantitative and qualitative features of geometry in enhancing the material for a specific expression of architecture; however, this expression can also have levels, from the role-playing expression to satisfy a desire to carrying a special meaning that can be interpreted in its own expression space. According to the results obtained from the evaluation of the geometric criteria, both in the reasonable dimension and in the tangible dimension, which are mentioned in the table below, it can be found that in the Soltanieh Dome, the reasonable geometry in the structure of the building using symbols including number and shapes have the most expression in the physical-spatial structure of this collection. Also, the presence of laws and features of tangible geometry, including symmetry, balance, harmony and other features have increased the tangible dimension or craftsmanship of this collection in the promotion of part to matter. Consequently, based on the authors' hypothesis regarding the role of reasonable and tangible geometry in the architecture of the Soltanieh Dome, it can be concluded that geometry has played a prominent role in all the diverse parts of this unique structure, both in the practical and perceptible dimensions.

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