

Generating a Functional Grammar for Architectural Design from Structural Hierarchy in Combination of Square and Equal Triangle

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Abstract : Islamic culture was accountable for a plethora of development in astronomy and science in the medieval term, and in geometry likewise. Geometric patterns are reputable in a considerable number of cultures, but in the Islamic culture the patterns have specific features that connect the Islamic faith to mathematics. In Islamic art, three fundamental shapes are generated from the circle shape: triangle, square and hexagon. Originating from their quiddity, each of these geometric shapes has its own specific structure. Even though the geometric patterns were generated from such simple forms as the circle and the square, they can be combined, duplicated, interlaced, and arranged in intricate combinations. So in order to explain geometrical interaction principles between square and equal triangle, in the first definition step, all types of their linear forces individually and in the second step, between them, would be illustrated. In this analysis, some angles will be created from intersection of their directions. All angles are categorized to some groups and the mathematical expressions among them are analyzed. Since the most geometric patterns in Islamic art and architecture are based on the repetition of a single motif, the evaluation results which are obtained from a small portion, is attributable to a large-scale domain while the development of infinitely repeating patterns can represent the unchanging laws. Geometric ornamentation in Islamic art offers the possibility of infinite growth and can accommodate the incorporation of other types of architectural layout as well, so the logic and mathematical relationships which have been obtained from this analysis are applicable in designing some architecture layers and developing the plan design.

Keywords : angle, equal triangle, square, structural hierarchy

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