Modern methods of designing the Islamic geometric decoration in Voronoi style

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Abstract

Islamic geometric patterns (IGPs) used precise geometric shapes, and figures inlaid with precious stones such as mosaics, agate, marble, and others in decorating the palaces of the Abbasid and Umayyad caliphs, as well as in decorating mosques, which made them architectural masterpieces full of creativity. The art of Islamic decoration is one of the finest Arts that expressed the Islamic religion. In a world in which the digital character is increasingly intertwined with daily life, parametric techniques have been used to develop solutions to design problems using numerical models with variable parameters, which makes the design easy to modify, which is one of the important features of digital design. It is also characterized by the concept of generation and communication which interests us in this study. Where it shares this feature with Islamic geometric decoration. Designers and architects are interested in Islamic engineering decoration, and through analysis and comparison, they noticed a relationship between Islamic patterns and Parametric design. They are able to analyze and make motifs in a very complex but easy-to-implement manner, because of these variables. The research aims to develop Islamic geometric motifs and find new and modern design solutions for Islamic geometric motifs using a parametric design to save time and effort. The researcher tried to find new solutions for the engineering design on one of the parametric programs (Grasshopper), and this research paper relied on four main axes;

First: Studying the concept of parametric design and generative design.

Second: tracing the origins of using parametric and generative thought in drawing inspiration from Islamic geometric ornamentation.

Third: The importance of parametric digital programming and techniques in finding contemporary design solutions derived from Islamic engineering decoration.

Fourth: The research presents some modern and contemporary applications of the Islamic parametric decoration related to the Voronoi style using the Rhino and Grasshopper programs.

key words

Islamic geometric decoration , parametric design , Voronoi mosaic , generative design .