

Writing a Parametric Design Algorithm Based on Recreation and Structural Analysis of Patkaneh Model: The Case Study of Oshtorjan Mosque

Authors : Behnoush Moghiminia, Jesus Anaya Diaz

Abstract : The current study attempts to present the relationship between the structure development and Patkaneh as one of the Iranian geometric patterns and parametric algorithms by introducing two practical methods. While having a structural function, Patkaneh is also used as an ornamental element. It can be helpful in the scientific and practical review of Patkaneh. The current study aims to use Patkaneh as a parametric form generator based on the algorithm. The current paper attempts to express how can a more complete algorithm of this covering be obtained based on the parametric study and analysis of a sample of a Patkaneh and also investigate the relationship between the development of the geometrical pattern of Patkaneh as a structural-decorative element of Iranian architecture and digital design. In this regard, to achieve the research purposes, researchers investigated the oldest type of Patkaneh in the architecture history of Iran, such as the Northern Entrance Patkaneh of Oshtorjan Jame' Mosque. An accurate investigation was done on the history of the background to answer the questions. Then, by investigating the structural behavior of Patkaneh, the decorative or structural-decorative role of Patkaneh was investigated to eliminate the ambiguity. Then, the geometrical structure of Patkaneh was analyzed by introducing two practical methods. The first method is based on the constituent units of Patkaneh (Square and diamond) and investigating the interactive relationships between them in 2D and 3D. This method is appropriate for cases where there are rational and regular geometrical relationships. The second method is based on the separation of the floors and the investigation of their interrelation. It is practical when the constituent units are not geometrically regular and have numerous diversity. Finally, the parametric form algorithm of these methods was codified.

Keywords : geometric properties, parametric design, Patkaneh, structural analysis

Conference Title : ICIS 2021 : International Conference on Islamic Studies

Conference Location : London, United Kingdom

Conference Dates : April 22-23, 2021