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Parametric Design Pioneers and their contribution to enrich Product Design computer programs

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Abstract:

This research was primarily concerned with studying the pioneers of parametric design in order to contribute to defining it and determining their vision and methods in establishing the formal and functional features of this trend, the positive or acceptable factors or principles in it, and the negative or rejected principles when determining the basics of design.
The most important of them is the Italian architect Luigi Moretti (1907-1973 AD); Who wrote about parametric architecture in his doctoral thesis in 1940 AD, and was the reason for the emergence of the term parametric design, in which he stated that determining the relationships between shape and its dimensions depends on a set of parameters, which are not only numbers, but can be shapes, surfaces, angles, and curves, which is considered the cornerstone of the methodology.
He was then followed by the Iraqi designer Zaha Hadid, which the public considered to be the basis of the revolution of the spread of the parametric trend, which defined the required and rejected features in the parametric trend.
The spread of Zaha Hadid's architectural designs is what led the computer revolution in engineering programs to achieve her creative requirements, which opened the way for furniture designers to create designs with structures. formality that follows Zaha Hadid's architectural designs, and that had a positive reaction in the Arab world, who accelerated to her designs in which she introduced the Capsark Building in Saudi Arabia and the first metro station in Riyadh, and the Expo City project.
then she entrusted the designer Patrick Schumacher to continue with her work, who continued the process of building parametric products and who had to introduce and adapt Islamic and Arab decorative units to satisfy Arab taste and increase the spread of this trend, therefore the Western designers were interested in studying Islamic decorative units and trying to integrate them into their parametric designs, in which the geometric units were the closest to the parametric rules because they were used to geometrical and mathematical input.
The most famous of scientist was Hankin, who had countless valuable studies to analyze geometric Islamic motifs and their constructive steps, which was then influenced by the world Craig Kaplan to create a computerized software specialized in drawing geometric Islamic motifs which helped other programs to developing their technological tools and computer additions to develop engineering drawing programs such as (Autodesk Inventor), (3DMax) ,(Grasshopper).
Research Problem: The problem of research is based on the observation of the study of the lack of interest in studying the pioneers of parametric design who formed the properties and principles of this trend and trying to unify these features through the vision of these innovative artists of parametric design, in addition to directing attention towards the vision of foreign artists of Islamic decorations, which were of interest to the West for their richness and ability to diversify and continue during the ages and analyze those compositions into geometric equations that designers can understand and use to rebuild these forms or build on them.
Research Importance: The importance of this research lies in shedding light on the analysis of Western artists of the steps of engineering drawing used by the Arab artist in enriching Islamic art, which was influenced by computer program designers in an attempt to interpret the vision of the pioneers of parametric design of Islamic art and thus when explained to future designers can understand these programs and interpret the ways to use computer tools to create these decorations.
Research Methodology: Descriptive method, Deductive method.
Research Results: The pioneers of the parametric trend were able to crystallize the form of this type of designs, which is what we see clearly in the computer drawing tools and the type of programs devised for their design ideas. Introducing mathematical algorithms and equations that helped designers in ways to drawing Islamic geometric motifs Devising engineering tools added to engineering drawing programs using the computer to be used in innovation and design processes. The great convergence between the design algorithms in the parametric direction and the shape building algorithms for the geometric Islamic motifs that the design benefited from with an explanation of how to benefit from them.

Keywords:

parametric design Pioneers, parametric design, parametric design creation

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