Ain Shams University
Faculty of Engineering
Department of Architecture

Geometry and Architecture

The Change of Geometrical Forms in Contemporary Architecture

A Thesis Presented to the Graduate School
of Ain Shams University in partial fulfillment
of the Requirements for the Degree of
Master of Science in Architecture

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

(شَهِدَ اللَّهُ أَنَّهُ لَا إِلَهَ إِلَّا هُوَ وَالْمَلَائِكَةُ وَأُولُوا الْعِلْمِ قَائِمًا بِالْقِسْطِ لَا إِلَهَ إِلَّا هُوَ الْعَزِيزُ الْحَكِيمُ

((18)

صدق الله العظيم

سورة آل عمران

Abstract

Considering the visual complexity of postmodern designs, *architects are left alone with no rigorous discipline to geometricize architectural forms*. Thus, there is a need to design a framework that can help architects to read and analyze and above all geometricize architectural forms. If "form," i.e., the system of organizing shapes, is considered an important visual dimension among the factors affecting the design process, so it is important to learn and understand its qualities and properties, . This research is concerned with the underlying structure of "form," namely: geometry. *The research aims to design a geometrical framework that represents the change between two distinctive formal paradigms in postmodern architecture, Paradigm One: Postmodern Architecture I and Paradigm Two: Postmodern Architecture II*.

The two paradigms studied in this research are: Paradigm One which includes: Historicism, Neo-Vernacular, Adhoc-Urbanist, and Metaphor Metaphysics; and, Paradigm Two which includes: Blobitecture, Organitech, and Fractal Architecture. This research uses two different approaches to design such framework and to analyze the two formal paradigms. The two approaches are basically: *The Structural Approach (Antoniades's Method and Ching's Method) and the Perceptual Approach (Arnheim's Mothedl)* – a geometrical framework. The proposed framework will help us to develop a better understanding of geometrical forms of the two paradigms.

The geometrical framework is comprised of *three measuring tools*, designed according to Antoniades's, Ching's, and Arnheim's methods, which is used separately and collectively to read the formal changes in postmodern architecture. In order to analyze the formal changes in postmodern buildings, the research focuses solely on "*museums" as an important and rich formal typology among known architectural types.* The *sampling units* used in this research are building types, namely "museums". Then, each paradigm, i.e., Paradigm One and Paradigm Two, is represented by its sub-trends; in each of these trends, a representative museum is selected to present its category in the paradigm tree. Each of the selected museums, as a trend representative, is analyzed using the three measuring tools. Finally, combined analyses and conclusions are presented. *First*, the method of analysis has been displayed. *Second*, sampling units has been discussed. *Third*, analysis process has been presented in tables and charts. *Fourth*, the change of geometrical form in Postmodern Architecture has been discussed.

The designed framework provides a tool that architects can use to geometricize and analyze architectural form. This research helps architects to clearly understand the changes that happened in the formal aspects of postmodern (contemporary) geometry in architecture.

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Sara Sahab

Dedication

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