Extended summary

Parametric Design In Representation Contemporary Architecture

“Conformation Arab And Islamic Culture Identity”

CURRICULUM: ANALISI E PROGETTO DELL’ARCHITETTURA E DEL TERRITORIO

Author

Hazem Diarbakrli

Tutor

Prof. Fausto pugnaloni

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Abstract

During the last years parametric design has been an interesting thing for Contemporary Architecture. As the 21st century brought parametric as new global design to representation architecture, CAD/CAM programs have evolved together with the algorithms to control and solve problems. New forms are added to architecture, which differ radically from the previous forms. Architects start to revisit algorithms to generate these complicated forms but with more control to fulfill more needs in design rather than only generating form. And With Computer Numeric Controlled (CNC) machines it was possible to mill, bend, 3D print or cast different materials to give almost any shape and enable manufacturing process. The technology exists and the principles that will enable us to use it in the best way possible have to be established. The increasing sophistication of software, has led to an already recognizable computer style characterized by smooth, digitally rendered surfaces, complex curvilinear forms. Architects still generally maintain a linear design process, limiting flexibility and freedom in intermediate design steps. The introduction of parametric and generative design through scripting alters the design process into a nonlinear path that extends idea manipulation and exploration late into the project development. Today, as parametric design gains popularity the desire for complex, architecture systems are rooted in using parametric design, which consisted of computing and algorithmic design.

This paper discussion parametric design representation in architecture since the introduction of computing. And explain how computers help the designer; the design process and the tools create architectural algorithms. It also gives a glimpse on new knowledge and skills designers need. And the impact of the computer on industry caused by the digital revolution in contemporary architecture through simulation algorithms.

The introduction of scripting software aids in filling the gap between NURBS based modeling program as rhinoceros and Revit, as well as becoming a powerful means to introducing more powerful generative and parametric capabilities. In the end description the scripting software, Grasshopper, was used to conduct empirical research where real problems were solved by Simulation computational algorithms. The example of a The Hangzhou Tennis Center applied parametric design. In case of study will discuss the most important architects who use style of parametric design in
Arab countries and analyze some of their work and The impact of this style on the mosque whether this style of design is eliminates the Arab culture and civilizations or proving the process of the evolution of the representation contemporary architecture while preserving the Arab culture identity.

1. Problem statement and objectives
After that characterized Arab architecture as a great and beauty building in the sixties of the last century, after that it became a problem of this era is embodied in commercial buildings, which commends the logic shortcut cost and lacks aesthetic grounds. Now the buildings oscillating between two things, either to take the old-fashioned which acquires pigment is an ancient folkloric or take the new form is unrelated to the spirit of the environment. Our problem in the Arab architecture requires reform "change" in this case the change would not mean random.

The offering technology and globalization as we discusses in the previous chapters, we cannot stand idly by, we must take advantage of this development not to avoid it, but with respect for our cultural identity. In the next section we will analysis the most important architects projects who have a significant role in the use of the style of parametric design in the Arab and Islamic world.

This research aims to study the parametric design and its components in representation architecture and illustrate the potential of the existing algorithms and computers to get to this style of design to be universal for the 21st The aim of the case of study is to proving the applying of parametric design in Arab architecture is not the end of civilization and culture. But on the contrary its proving that is with rationality in process of using parametric design is evolution of the representation in architecture while preserving the Arab culture identity.

Objectives
The research aim will be achieved by: -
- Presented the general introduction of parametric design through freeform
- The documents about architectural works consider the concept of parametric design to specific geometric operations.
The impact of computer aided design 'CAD' and computer aided manufacturing 'CAM' on contemporary architecture

Tools that were introduced recently on a computer to generate design.

Studying of the changes brought by the algorithms to architecture.

Applications of algorithms in contemporary architecture.

Presenting the research of Digital industry on developing strategies that enable digital parametric projects to become real especially in 21st century.

Clarify what provided by the digital industry to reduce the difficulty of the implementation of complex projects.

Explanation of parametric design systems and the generative tools in architectural design.

Analysis of some examples of the most important architect and projects which they had an impact on contemporary architecture by using style of parametric design to confirmation the Arab and Islamic culture identity.

2. Research planning and activities
The researches launched from the idea of observing the lack of interest in the use of modern methods in architecture and copy the architecture from our ancestors. Most notably in the Arab areas, but he was the belief that new forms may bring risks to the Arab world, to its negative impact on cultural identity.

The research planning started from the idea of a parametric design after consideration of the free form design in the last two centuries, and what Computational Geometric offer for architect especially with the use of algorithms in architecture, then we discussed about the evolution of digital technology it leave a big effect to know about how we can execute any kind of design with unlimited of complexity. And discussed in the last chapter of parametric design and why we use it in our architecture, the Generative design and algorithm in the programs as rhino using the scripting of grasshopper will make any kind of design possible.

The architect start to use parametric design in them design to have new vision of the architecture, in case of study discussed the finger print of some famous architects as zaha hadid and jean novel to Confirmation Arab Cultural Identity In Contemporary Architecture.
3 Analysis and discussion of main results

The architects today are able to overcome the thought of their own. Through the use of parametric design, and algorithms, and advanced computer systems, designers are able to present their ideas in the world of unknown and unimaginable complexity. The dominant mode for using parametric design in architecture today is a combination of manually driven design decisions and formally responsive computer applications. The style of using parametric design in architecture today is a combination of design decisions driven manually and Computer Applications officially response. Algorithms provided the architect relationship between the needs of the architect and the ability of a specific program to address these needs at all times.

Explore the algorithms in the form of generation, highlights the importance of rule-based systems as an integral part of the parametric design process and rules. Without the application to generate arithmetic sequences found in parametric design, the practice of design and construction not is possible. And William Mitchell explains that one can, write a limitless variety of shape generation procedures that can quickly be executed by computers, but would be impossibly laborious if executed by hand. These procedures make use not only of curve generating functions, but also computational mechanisms such as iteration, recursion, and the conditional application of rules (Kostas Terrifies, Expressive Form: A Conceptual Approach to Computational Design). The benefits of parametric design that is provide the potential to reorganize structure in a more freeform way that can foster relationships to the whole. Parametric has the ability to be more responsive then a structure designed by more conventional methods. A benefit parametric is a term used in a variety of disciplines of mathematics and algorithms through the design. It literally means working within the parameters of a specific group. In the field of contemporary design, it refers broadly to the use of parametric modeling software. It is a process used to manipulate, and the renewal of the design objects on the basis of a set of rules or parameters. And is now being used widely in the fields of parametric design architecture and product design. Application of parametric design in architecture re-use of information technology in architecture, from a mere tool parametric presentation to the counterpart of the human imagination, and a source of
ideas, and a gateway to another world new to the human mind. Creative, free form buildings are designed using parametric design methods, e.g. Beijing Olympics Stadium and the Beijing National Aquatics Centre (Stocking 2009). High-rise building design also starts to utilize parametric methods (Park et al. 2004; Gane & Haymaker 2007).

Conclusion
The progression of history and evolution technology with revolution industry has led to the emergence of Parametric design, in the last few years was obvious specially when we start to apply it on many fields. it does not mean because of the lack capacity of architects to discover this design, but because the lack of tools to implement these kind of designs. In the 1960s and CAD modeling remained a primitive and with the developing system until the late 1980s with the integration of a parametric engine with CAD software. Ought to not simply be all applications with Computer-aided design are digital recording of a design. Rather with the technology of Parametrics, algorithms for example, designs can now be generated from mathematical sequences and limits. In a generative model, parameters are identified and constraints are established and impact the outcome of the design. Kostas Terzidis recognizes the relationship between algorithms and computation. Exploring algorithms in form generation highlights the importance of rule-based systems as an integral part of the parametric design process and rules. CAD and CAM are start applying in big experiences and elements as the 3D-printed houses. The use of these techniques in larger scale projects requires not only the training and availability of equipment, but also to understand and manage the massive customization of designs. Building process is traditionally oriented to unique result, so these tools can suggest more possibilities for the specific work as well as other applications. Introduction of these procedures can motivate practitioners and patrons to apply these capabilities for diverse building needs. This demonstrates clearly the capacity in the implementation of projects that use parametric style in the designs. A parametric design is configured from computer generators with algorithms rules, parametric script and associative design, this configured it dose not exclude the architect or designer from the process. It is the individual who chooses the constraints or the limits on the algorithms as to utilization it in Rational way. Parametric design systems allow a
stepwise control over the form during the design process, which Confirms to be useful and flexible during design exploration. Today, Parametric has a big potential and day-by-day the architects are exploring the possibilities of it. The grand thinking in the future of parametric designing is to create a new urban environment. Patrik Schumacher believes architects need to give value and direction to take advantage of these tools. And actually if we have a look of the future architecture in many project proposed around the world in next 10 years will find it parametric design and Michael Meredith agrees saying,

The future is parametric, I have no doubt it will be, but technology won’t fix all our problems; unfortunately, they’re much deeper and much more human. Architecture can only be critical of difficult or meaningful or complex if it directly engages culture, if it becomes meaningful to social cultural network [560].

In conclusion in the case of study that We must realize that we need new form in representation architecture in the Arab world, We are fed up and feeling bored of rigid forms that we've seen in ages and centuries, we are now have the tools to move into a new style in the design of our future buildings, for how long will stay copy the old and traditional architecture, Is it not the date of transition to design buildings more streamlined and vitality! We do not deny that the evolution of architectural has disadvantages, but the advantages that may overcome one way or another, the evolution as the "train" Who take you to a world full of surprises, either to stay at the station or to go up in this train, with Knowing that we can bring what we need from our East clothes, which is the Arab or Islamic culture. We must realize that it is not square or rectangle or circle shape are the architecture that came by our ancestors, which they inherited from their ancestors is just that indicate the relationship between architecture and culture. Architects as Zaha Hadid and Jean Nouvel are one of the pioneers of Arab and Islamic world, which may adopt this spot in the earth, and as became aware in their designs they were able to use the style of parametric design to prove the identity of Arab and Islamic culture in simplest ideas, but what about the identity of the architects! Where are Arabs Architects! Is the Arab architects disappeared after Hassan Fathi, which he forced to travel to the West because of the restrictions of project proposed! How long we will stay idly! What train are we waiting?
References


[32] Ibid.


[55] Artificial Intelligence (AI) is a branch of computer science concerned with the problem of how to simulate human intelligence. AI is as old as the invention of the first computer, or, to be more precise, of the first counting machine.
[71] Pablo Miranda Carranza & Paul Coates, *Swarm modeling: The use of Swarm Intelligence to generate architectural form.*


[95] Vanucci, M. *Open systems: approaching novel parametric domains*, in M. Meredith and M. Sasaki (eds) From Control to Design: Parametric /


[117] Afif Bahnasi, urbanization cultural between heritage and nationalism, Arab


