

## PARAMETRICISM FOR URBAN AESTHETICS

*A flawless order behind chaos or an over-design of complexity*

ELİF BELKIS ÖKSÜZ

*Istanbul Technical University, Faculty of Architecture  
elifb8807@gmail.com*

**Abstract.** Over the last decade, paradigm shifts in the philosophy of space-time relations, the change from space-time to spatio-temporality, caused significant changes in the design field, and introduced new variations and discourses for parametric approaches in architecture. Among all the discourses, parametricism is likely the most spectacular one. The founder of parametricism, Patrik Schumacher (2009) describes it as “a new style,” which has “the superior capacity to articulate programmatic complexity;” and “aesthetically, it is the elegance of ordered complexity in the sense of seamless fluidity.” In its theoretical background, Schumacher (2011) affiliates this style with the philosophy of *autopoiesis*, the philosophy that stands between making and becoming. Additionally, parametricism concerns not only the physical geometry in making of form; but also discusses the relational and causal aspects in becoming of form. In other words, it brings the aesthetic qualities in making through the topological intelligence behind becoming. Regarding that, parametricism seems an effective way of managing /creating complex topologies in form-related issues. However, when it comes to practice, there are some challenging points of parametricism in large-scale design studies. Thus, this work underlines that the dominance of elegance for urban planning has the potential of limiting the flexible and dynamic topology of the urban context, and objectifying the whole complex urban form as an over-designed product. For an aesthetic inquiry into urban parametricism, this paper highlights the challenging issues behind the aesthetic premises of parametricism at the urban design scale. For that, Kartal Master Plan Design Proposal by Zaha Hadid Architects (2006) will be discussed as an exemplary work.

### 1. Making, Becoming, and the Autopoiesis in Between

When it comes to aesthetics in design, art and architecture are the disciplines that prioritize the assessment of the two key phenomena in aesthetics, *form* and *idea*. However, compared to art, architecture is the one that directly involves causalities and programmatic experience in these phenomena. Hence, the production and representation of an architectural form is likely the most problematic issue among all the others in the design field. ‘Form’ is a phenomenon defined by artists and evolutionists through the philosophy of ‘making’ or ‘becoming’ since Plato (Karatani, 1995); and the philosophy behind *making* and *becoming* of form depends heavily on the space-time dialectics. While making refers to space-based relations, becoming refers to time; yet, most of the form studied in architectural design seems to be stuck in between these two for a long time. Nevertheless, over the few decades, the paradigm shifts in the philosophy of space–time relations, the change from space–time dialectics to spatio-temporality, also caused significant changes in the design field, and introduced new variations and discourses for parametric approaches in architecture.

Right after the modern era, most of the theoretical discourses in architectural design such as postmodern, avant-garde, and emergent systems tend to see form as a process, a complexity that is a becoming of different causal relations; and most of them tend to represent architectural forms through non-Euclidian forms. Within this regard, the space we talk as an architectural form serves no longer for the probabilities, but it serves for the possibilities, for the unexpected events and new experiences. In other words, the use of geometry has gained new meanings in architectural design process, and its representation as well. As designers, we are now describing the architectural geometry not only to represent fully programmatic functional and material relations, but also to represent complex topologies – social relations, cultural aspects, events and movements. Currently, computational design tools are widely used to parameterize, and control complex dynamic relations of form. More, these dynamic relations also affect the aesthetical aspects of form. The paradigmatic shift, from space-time to spatio-temporality, has increased the parametric design approaches in architecture. And, among all the approaches, parametricism is likely the most spectacular one. Over the last decade, the paradigm shifts in the philosophy of space–time relations, the change from space–time to spatio-temporality, also caused significant changes in the design field, and introduced new variations and discourses for parametric approaches in architecture. Among all the discourses, parametricism is likely the most spectacular one.

The founder of parametricism, Patrik Schumacher (2009) describes it as “a new style,” which has “the superior capacity to articulate programmatic

complexity;” and “aesthetically, it is the elegance of ordered complexity in the sense of seamless fluidity.” From interior design to urban planning practices, parametricism has been evidenced at different scales (Schumacher, 2009). And it seems that, this new style provides new perspectives for urban design and its aesthetic inquiry.

As a computational approach, while parametricist approaches help to manage heterogeneous complexity of an urban context, they also give us a chance to discuss the urban context through aesthetical values. Regarding that, parametricism seems an effective way of managing/creating complex topologies in form-related issues. Nevertheless, when it comes to practice, there are some challenging points of parametricism in large-scale design studies. Whereas the use of computation represents the becoming of form; the elegance or the aesthetic intentions represents the making. Thus, this work emphasizes the dialectic of making and becoming philosophies in parametricism. In this dialectic, it claims that focusing more on the aesthetical values weakens the power of parametricism for large complex systems, such as urban design. This work also notes that the dominance of elegance for urban planning has the potential of limiting the flexible and dynamic topology of the urban context, and objectifying the whole complex urban form as an over-designed product. Therefore, with an aesthetic inquiry into urban parametricism; this work highlights the challenging issues behind the aesthetic premises of parametricism at the urban design scale. For that, Kartal Master Plan Design Proposal by Zaha Hadid Architects (2006) will be discussed as an exemplary work.

## **2. The Elegance**

As part of a computational design theory, the capacity of parametric approaches is much wider than the capacity of intuitional/analog techniques. Regarding the part-whole relations and inner-outer values, the tools and techniques that are developed in the digital media provide a variety of problem solving alternatives for designers (Simon, 1997). The heterogeneous pattern of different relations can be assessed in more complex and efficient ways for numerous solutions.

After the modern era, the aesthetic phenomenon of an urban form has been affected by the paradigm shift in architectural geometry. All the post-, neo-, avant-garde or even computational discourses in design have changed use of dimension for architectural geometry from 2D to 3D. And, with parametricism, the architectural geometry now reconsiders time as the 4<sup>th</sup> dimension to be represented and generated by new computational tools and techniques. This new style has affected the making and becoming philosophies of form in every design scale. In its theoretical background,

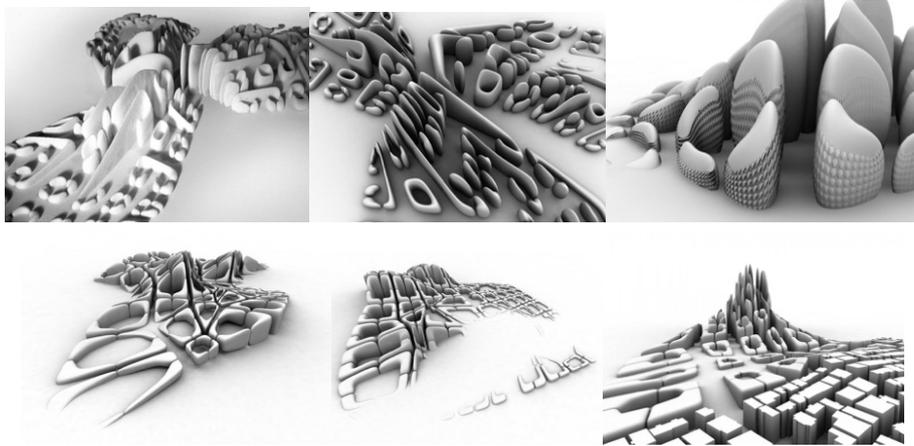
Schumacher (2011) affiliates this style with the philosophy of *autopoiesis*, the philosophy that stands between *making* and *becoming*. Additionally, parametricism concerns not only the physical geometry in making of form; but also discusses the relational and causal aspects in becoming of form. In other words, it brings the aesthetic qualities in making through the topological intelligence behind becoming.

Though, unlike modern or post-modern approaches, the aesthetical inquiry in parametric approaches takes a place in the design process, not at end of the process (Rahim and Jamelle, 2007). However, Antoine Picon (2003) emphasized that computational design has some challenging issues under the aesthetic phenomenon. According to Picon (2003), there is a significant amount of arbitrariness in the design and selection process of form; and from micro- to macro- scales, that particular form can be applied on any scale. Therefore, recent parametric applications in form finding studies are not only about generating complex geometries, but also using tools and techniques with a sophisticated intelligence. Parametricism for that matter, aims to reach the aesthetic beauty of form through the relational and heterogeneous complexity (Schumacher, 2012). Schumacher (2009) claims that, parametricism is ‘the new architectural style’ to achieve elegance, the sophisticated beauty of form.

### **3. Urban Parametricism and Its Aesthetic Inquiry**

As Brian Massumi (2002) emphasizes in his book named *Parables for the Virtual*, choosing the proper geometry for design is not only choosing the potential modulations of form, it is also choosing the lives for that particular form. In this framework, the weakest point of parametricism for urban design is prioritizing the aesthetic values in the design process. Regarding its theoretical background and practices for the urban scale, it seems that parametricism has the potential of being an over-design approach for a complex system, and objectifying the urban form.

In this framework, to discuss the aesthetic inquiry of parametricism with its theoretical background and its practical premises over an exemplary work, this paper examines Zaha Hadid Architects’ (ZHA) winning proposal for Kartal-Pendik Urban Design Competition (2006) in Turkey (Figures 1–4).



*Figure 1.* Stills from the design process, ZHA, 2007

The design process starts with the hair tool for creating roads, transportation lines, and building blocks (Figure 2). Then the process continues with the form finding studies for the topological evaluation of different functional, social, and topographic values.



*Figure 2.* The representation of emerging roads and blocks with hair tool during design process, ZHA, 2007.

As an architectural style, parametricism relates to use of computational techniques and the generation of tools for the design process (Schumacher,

2012). Hence, each of these tools or techniques is also designed with a particular aesthetic prospect. In their design projects, the team designed a particular design tool with ‘calligraphic’ features for the building forms. Considering the user equality, Schumacher claimed (2009) that approximately a hundred different building forms are generated with this calligraphic design tool (Figure 3).



*Figure 3.* Examples of generated building forms with calligraphic design tool, ZHA, 2007.

While a parametric approach has the power of generating one hundred alternatives for different type of users at once, the aesthetical intention behind the calligraphic tool in the project is recognizable only in the urban planning. Therefore, it is difficult for the users to acknowledge the sophisticated intelligence behind the building forms or perceive the aesthetic intentions (the calligraphic concept) of those buildings (Figure 4).



*Figure 4.* Stills from the buildings, ZHA, 2007.

#### **4. Discussion**

Regarding the numerous social, programmatic, ecological, and economical parameters in the urban system, an urban form can be seen as an organic form of dynamic relations. And no matter how slow they are, there are ongoing transformations and changes in these relations which will eventually affect the form. Therefore, an urban design should not be seen as a single problem to solve at once, but it should be seen as a complex of different problematics that requires time or becoming. Accordingly, compared with intuitional design approaches, parametric design has great potential for implicating spatio-temporal dynamics of form. In parametric approaches, various programmatic, social, conceptual and environmental relations are used or tested for real-time simulations. All these parameters can be simultaneously managed and enhanced as inputs for different computational design tools and algorithms. Hence, parametricism has the advantage of controlling complex topologies of an urban form and creating systematic organizations under different concepts.

Still, when parametricism is considered as a style and applied under conceptual approaches for an urban design, we are likely to face over-designed, arbitrary solutions. When parametricism is defined as a style where aesthetics meets sophisticated intelligence, we may claim that its dominance on the aesthetic beauty weakens the intelligence of its topological relations at urban scale. Whereas all the parametric relations are based on multiple topologies of different systems; and all these relations can be simultaneously applied, their outcome as a whole represents a single homogeneous form or a pattern. In parametricism, whenever any of these parameters change, the whole form is affected by that change. No matter how sophisticated or intelligently designed, the aesthetic intentions of a conceptual parametric form or the homogenous part-whole relations behind that form would eventually stand against the urban transformation.

#### **4. Conclusion**

Although parametric approaches in large-scale studies, as in urban planning, have the great advantage of controlling multiple relations or creating simultaneous, flexible, and complex organizations, the aesthetic inquiry or conceptual intentions behind parametricism seems 'arbitrary.' As in ZHA's exemplary work (2006), the implication of computational tools for aesthetic intentions (the implementation of calligraphic features) in building scale is not as effective as it is in urban scale. Since each system has its own parametric rules for its own scale, the aesthetic response of an urban form cannot be compared to the aesthetic response of a building form. Also, using

the same computational design tools for different design scales, might suppress the sophisticated intelligence behind the aesthetic values of parametric forms. Therefore, parametricism for urban design stands at the edge for now. Even though it seems like a flawless order behind chaos, it also seems like an over-design of a complex system for its users.

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