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*VERSUS* PARAMETRICISM<sup>1</sup>*VERSUS* PARAMETRYZM

## Abstract

Through numerous references to language and etymology, philosophy, aesthetics, and the theory of automatic systems, the essay aims to question the use of parametric technologies, whether generative or not, in the field of architecture and much less so in the field of design. Such technologies are not only dehumanising but also make us lose all reference to the concrete reality of construction and to the poetic and ideational aspect as well as to the authorial one. A para-project that therefore not only 'throws forward' but also allows for additions, corrections, amendments, and rhizomatic proliferations depending on use or changing needs.

The dehumanising power of technology, which deludes many of us with magnificent progressive fates, with previously unexplored possibilities, on closer inspection hides a distance, a dramatic estrangement with architecture itself and its millenary foundations. The non-transient foundations that constitutively, no instrumental technique will ever even be able to shake. The art of building, *Baukunst* "masters and dominates" techniques and, by definition, cannot be its servile defeated or servant.

The captivating but commodifying and homologising mirage of a self-generating grammar of shape does not allow the convenient, adequate and intelligible forms, capable of a generalised reception à-la Benjamin, in their non-automatic but intentional relationship, to become expressive of the value and meaning of buildings.

*Keywords: parametricism, self-generating shape, adequate forms*

## Streszczenie

Odwołując się do licznych odniesień do języka i etymologii, filozofii, estetyki oraz teorii systemów automatycznych, esej stawia pytania dotyczące wykorzystania technologii parametrycznych, zarówno generatywnych, jak i niegeneratywnych, w architekturze, a także w mniejszym stopniu w projektowaniu. Technologie te nie tylko prowadzą do dehumanizacji, ale również sprawiają, że tracimy odniesienie do konkretnej rzeczywistości budowy oraz do aspektu poetycznego, ideacyjnego i autorskiego. To zatem para-projekt, który nie tylko „rzuca do przodu”, ale także dopuszcza dodatki, korekty, poprawki oraz ryzomatyczne proliferacje w zależności od użytku czy zmieniających się potrzeb.

Dehumanizująca siła technologii, która ma wielu z nas wspaniałymi, progresywnymi przeznaczeniami i wcześniej nieodkrytymi możliwościami, przy bliższym spojrzeniu skrywa dystans, dramatyczne wyobcowanie względem samej architektury i jej tysiącletnich fundamentów. Tymi fundamentami, które nie są przemijające, żadna technika instrumentalna nie będzie w stanie nawet zachwiać. Sztuka budowania, *Baukunst*, „panuje i dominuje” nad techniką i z definicji nie może być jej pokonanym sługą ani podporządkowanym narzędziem.

Pociągający, lecz komercjalizujący i ujednociający miraż samogenerujących się gramatyk kształtów nie pozwala na to, by wygodne, adekwatne i zrozumiałe formy, zdolne do powszechnego odbioru

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à-la Benjamin, w ich nieautomatycznym, lecz intencjonalnym związku, wyrażały wartość i sens budynków.

*Słowa kluczowe: parametryzm, samogenerujące się kształty, adekwatne formy*

## WHAT'S A 'PARAMETER'?

A parameter in general is a 'term of reference', a criterion of judgement or a norm. Parameter refers back to the Greek *métron* (measure) with the addition of the prefix *para-* corresponding to the preposition *pará* (at, near, besides, beyond) with the second meaning of 'akin, approaching, flanking'. Parameter – from which parametric derives – therefore, although it refers to the measurement, it does not coincide with it but comes close to it, approximates it, goes alongside it, in fact determining the dual condition of measure/para-measure and also defining a term of reference against which to compare a given action or artefact.

Coming to a more appropriate architectural lexicon, the notion of 'parameter' is opposed to that of 'symmetrical' [another compound of *mètron* with the prefix *syn-*, the former being almost a measure, a kind of measurement, while the latter is literally 'with measure'. Plato reminds us in the *Philebus* that "measure and symmetry are everywhere and always beauty and virtue"<sup>2</sup> and in the *Political* that "the architect 'partakes of the cognitive science'<sup>3</sup> because his knowledge is calculation and measurement, which are precisely the 'speculative arts'<sup>4</sup>. For Plato, who condemns the mimetic arts in the tenth book of the *Republic*, architecture is ultimately distinct from and superior to them in that "[...] the art of building, which makes use of many measures and instruments, I believe that this very fact that provides it with much precision makes it the most technical of most sciences"<sup>5</sup>. The Athenian philosopher therefore emends architecture precisely because it pertains to the measurement and techniques understood as skill and not to the para-measurement, variability but to the deep and precise knowledge that it induces among the sciences.

If, on the other hand, we look at the term 'parameter' in mathematics, it designates a constant appearing in an equation of an analytical function and describing a curve or surface. A factor that, when it varies, produces a family of forms referable to that general equation. Constants make that functional expression that links dependent and independent variables change, fluctuate, fixing a particular configuration in the plane or in space. The parameter modifies, within a class of possible structures, a particular form to satisfy certain fixed numerical requirements. The parameter constraint forces the general expression and thus the family of curves within a given morphology. Locking a parameter will result in a certain structure, changing its value will result in another, and so on within a certain variational range. Therefore, the parameter's variation does not establish stable relations, proportions, but only feeds the possibilities of obtaining different shapes. For Luigi Moretti<sup>6</sup>, one of the forerunners of the parametric method applied to architecture, we must seek "solutions centred

<sup>2</sup> Plato, *Philebus*, 64 e, translated by author.

<sup>3</sup> Plato, *Political* 260 a1, translated by author.

<sup>4</sup> *Ibidem*, 259e, translated by author.

<sup>5</sup> Plato, *Philebus*, 55d–56c, translated by author.

<sup>6</sup> The Italian architect Luigi Moretti founded the IRMOU\_Institute for Mathematical and Operational Research Applied to Urban Planning in 1957, where 'parametric architecture' was mentioned for the first time.

on the quantifiable ‘parameters’ of the phenomena that cost the functions for which we seek the ‘parameter’ forms, which consequently, singularly and in their interrelationships, which are also quantifiable, establish the limits within which the forms that those functions fulfil are identified and designed [...]

The ‘parameters’ and their interrelationships thus become the expression, the code, of the new architectural language, the ‘structure’, in the original and rigorous sense of the word, defining the forms that those functions fulfil. The determination of the ‘parameters’ and their interrelationships must be aided by the most up-to-date techniques and instruments of scientific thought, particularly mathematical logic, operational research and computers, especially the latter because of the possibility they offer of expressing the probable solutions of the parameter values and their relationships in self-correcting cyclic series. To the development of this approach and to the new method and theory specified in its schemes and verified in its first, and I would say exalting, results I gave the name ‘Parametric Architecture’.<sup>7</sup>

If the parameter inherently relates to measurement in terms of alteration, the algorithm with which it can be associated relates to a procedure that solves the calculation of a given problem or the analysis of a phenomenon. Algorithm, named after the Persian-Arabic mathematician al-Huwārisimī, makes use of equations and thus numerical parameters confirmed by the Latin attraction *arithmus* derived from the Greek *arithmós*, which refers to the notion of ‘number’.

## ALGORITHMIC SYSTEM

An algorithmic system is a complex of mathematical operators that solves a series of problems by means of parameters and operationals. In the field of computer science, a problem can be defined as ‘computable’ if it can be solved by means of an algorithm through which a system can then be constructed to automate a given procedure by programming software that uses a defined language or code to translate the algorithm for the machine that is to execute it.

The possibilities inherent in the parametric and the algorithmic, and thus on the one hand in the potentially infinite variation of the factors determining a certain form, and on the other in the possibilities of calculating the outcome through appropriate operational sequences, lead quite quickly in the declination to artistic constructs or intentional artefacts such as architecture, to a very wide range of solutions that cannot be predetermined by the creator – who in theory could not only be multi-typical and interchangeable, but even absent – but merely the outcome of an incessant folding of surfaces (NURBS\_Non Uniform Rational B-Splines) subject to continuous mutation.

## OPERA APERTA AND PARTICIPATIONISM

This developing characteristic cannot but refer to the hypothesis of the ‘open work’ formulated by Umberto Eco in 1962 in his well famous book *Opera aperta*. According to the

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<sup>7</sup> L. Moretti, *Carteggio con Giulio Roisecco* [in:] F. Bucci, M. Mulazzani, *Luigi Moretti. Opere e scritti*, Electa, Milano 2001, pp. 204–208.

semiotician, an ‘open work’ would be a “proposal of a field of interpretative possibilities, [...] a configuration of stimuli endowed with a substantial indeterminacy, so that the user is induced to a series of readings that are always variable; [...] a constellation of elements that lend themselves to different reciprocal relations”<sup>8</sup> and again “these new works [...] consist, not in a closed and defined message, not in a univocally organised form, but in a possibility of various organizations entrusted to the initiative of the interpreter, and therefore present themselves not as finished works [...] but as ‘open’ works, which are completed by the interpreter at the same time as he uses them”<sup>9</sup>.

This ‘mobility of the work’, which cannot be defined by the author but is open for interpretation, on the one hand denies the finiteness of the ergon, but on the other opens up to continuous deformation through the multiple hermeneuses /transgressions of the form which, far from being intentionally constructed as a “sensitive manifestation of the Idea” (Hegel), becomes iridescent, shapeless and always available for the subversion of the underlying reasons and motives, starting from the requests of the user or the client/customer and never from the creator. In fact, according to Eco, “the poetics of the ‘open’ work tends, as Pousseur says, to promote in the interpreter ‘acts of conscious freedom’, to place him as the active centre of a network of inexhaustible relations, among which he establishes his own form, without being determined by a necessity that prescribes the definitive ways of organising the work enjoyed”<sup>10</sup> whereby the author “instead of suffering ‘openness’ as an inevitable fact, elects it as a productive programme, and indeed offers the work in such a way as to promote maximum openness”<sup>11</sup>. This structural and sought-after ambiguity and non-conciseness of the work refers in many ways to a certain idea of bottom-up participationism according to which, for De Carlo, “a work of architecture, in addition to improving the material conditions of its recipients, must be a support for their need to communicate by representing themselves. Therefore, the structure of the work must be designed in such a way as to allow continuous adaptations and always new transformations, which can be substantiated with the project as true extensions of it”<sup>12</sup>.

A project that therefore not only ‘throws forward’ but also admits additions, corrections, amendments, rhizomatic proliferations depending on use or changing needs. However, it should be noted that De Carlo himself recognises that “use has no influence on the project produced; indeed, the object is considered all the more successful the more it can resist the subversions of use”<sup>13</sup>. So, if it is not use that can determine modifications, alterations to the successful work, then what should induce these dynamic and mobile ‘openings’ of the work? Perhaps the free interpretations, or the commutative combinations *à-la* Chomsky, which are ultimately nothing more than recursively or properly parametric variations of an autological nature?

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<sup>8</sup> U. Eco, *Opera aperta. Forma e indeterminazione nelle poetiche contemporanee* [1962], Bompiani, Milano 2016, p. 154.

<sup>9</sup> *Ibidem*, p. 33.

<sup>10</sup> *Ibidem*, p. 35.

<sup>11</sup> *Ibidem*, p. 36.

<sup>12</sup> G. De Carlo, *Il Pubblico dell'architettura* [1970] [in:] F. De Pieri (ed.), *La piramide rovesciata. Architettura oltre il '68*, Quodlibet, Macerata 2018, p. 71.

<sup>13</sup> G. De Carlo, *L'architettura della partecipazione* [1973] [in:] S. Marini (ed.), *L'architettura della partecipazione*, Quodlibet, Macerata 2017, p. 69.

As Antonio Monestiroli has argued with regard to *Opera aperta*, “This book, [...] essentially contains a theorem, [which] somehow fuels disengagement [...] In *Opera aperta*, Umberto Eco argues that the work of art [...] cannot have an affirmative character and that the main characteristic of art, which is admitted by all, lies in its ambiguity. The idea that a work of art is valid if it contains a truth and its opposite, that is, if it allows for different interpretations, ultimately, if it is not a simply affirmative work, has had many, many followers. [...] For [...] as far as architecture is concerned, it still seems to me now, forty years later, impossible to deprive it of its main character, which consists precisely in its being an affirmative art, that is, an art that carries a positive, constructive message, to use the word most suitable for architecture”<sup>14</sup>.

## POST-HUMAN

On 21<sup>st</sup> October last year, Alberto Cuomo, professor emeritus of the University of Naples ‘Federico II’<sup>15</sup>, wrote on Facebook:

The ‘parametric’ is only a technique. In architecture, its exaltation, supported by ineffective ideologies on the biomorphic, the post-human, with pistol-poles on the alleged salvation of the planet, only demonstrates cultural paucity and a substantial inability to design. On the other hand, those who use the programmes of so-called ‘parametricism’ (as if ‘pencilism’ had existed in the past), Rhino™, Grasshopper™, etc., only ever produce the same design, showing, subject as they are to the computer, imaginative sterility and an absolute lack of critical sense.

The post triggered a violent controversy between those who adhered to such a critical stance against the instrumentality of techniques and those, especially the younger ones, who saw this technology, which however always implies an ideology, as a useful operational/creative tool capable of revolutionising the usual methods of architectural design, opening up new, unprecedented and unprecedented expressive possibilities through ‘procedural’ modelling.

The variational and pseudo-generative possibilities allowed by visual algorithms or the augmented reality simulations connected to the virtualised and de-realising production of complex and multi-curved shapeless forms are not strictly speaking architecture – understood as an intelligible mode of a formal order – but only a substitute mode, a quick device to make those constructs usable and or worse, to reduce the art of building to images alone.

Those who rely solely on modelling tools and the far-fetched possibilities of calculation and their apparent freedom, which in the final analysis is a submission to a domain with the illusion of maintaining control, in fact renounce the imagination of forms, their pre-vision with the eyes of the mind and bet, by means of rehearsal or recursive games, on the illusory autopoiesis of forms. But the forms, deprived of a sense and a meaning to be represented and reduced to a pure play of syntagmas or complex or ‘folded’ geometries of Deleuzian memory, which ultimately become banally mimetic of natural forms, are reduced to an onanistic and sterile formalism without any control, balance or proportion. An automatic game of fluid,

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<sup>14</sup> A. Monestiroli, *Antonio Monestiroli* [in:] M. Biraghi (eds.), *Italia 60/70. Una stagione dell’architettura*, Il Poligrafo, Padua 2010.

<sup>15</sup> A. Cuomo, *La fine (senza fine) dell’architettura. Verso un philosophical design*, Deleyva, Ladispoli 2015.

unstoppably and programmatically unrestrained writing, a phylogenesis *sine ulla mensura* leaning towards an unattainable *a-perion*.

## DEHUMANISING POWER OF TECHNOLOGIES

The dehumanising power of technology, which deludes many of us with magnificent progressive fates, with previously unexplored possibilities, conceals a distance, a dramatic estrangement with architecture itself and its millenary foundations. The non-transient foundations that no instrumental technique will ever even shake. The art of building, *Baukunst*, ‘masters and dominates’ techniques and, by definition, cannot be its servant or succubus. The technique that these new *technitēs* (carpenters) are seduced by the productive and ‘self-constructive’ illusion permitted and stimulated by the digital and visual scripting tools that take on progressive appearances and are capable of unprecedented performances that were impossible before is, in the end, a mere refuge, a pseudo-protection, a cave that in reality – as Vincenzo Orgitano wisely observes – is a ‘cage’ that is anything but a ‘cage’. The absent-minded and reductive praise of doing, of practice, of that which must serve (servile) the professional market, tightens the screws of this trap even more. Praxis without a critical foundation and a conscious, non-observational judgement on the world and its contradictions is only heterodirected performance, banal commodification, authentic de-humanisation. No culture, no vision, only instrumental euphoria, verbal violence to conceal an evident inconsistency and argumentative incapacity. The assertion, the statement that one cannot even talk about a certain technique simply because one does not know how to use it, is logically inconsistent and indefensible. Cultural intellectual equipment allows those who possess it, when it is broad and layered, to be able to argue about any aspect of reality including Rhinoceros™, Grasshopper™ or any other animal ready to pounce or bite... I point out that the term ‘grasshopper’ also refers to a famous cocktail and, as is well known, for Mies “architecture is not (and in no way can be) a Martini cocktail”, it is not mixing, it is not amalgamation, it is not a game of changing a parameter and “let’s see what happens” ...

## PARAMETRIC TURN

The parametric, which, as we have seen, originates from mathematical acquisitions, from Lagrange via Coons, arrives at architectural design, but also at urban planning, according to various declinations and adaptations made by Gross to some MIT researches, up to the theorisation made by Patrik Schumacher with his *Manifesto*<sup>16</sup>, according to which Parametricism<sup>17</sup> would even be a ‘new style’. A style that would aim, in wanting to make itself eponymous with complexity<sup>18</sup>, to overcome, in one stroke, modernism, post-modernism and

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<sup>16</sup> P. Schumacher, *Parametricism as Style – Parametricist Manifesto* [2008], “AJ – The Architects’ Journal” 2010, no. 231(16).

<sup>17</sup> Parametricism extends BIM technology to parametric prefiguration of architectural or urban form up to Design.

<sup>18</sup> M. Accardi, *Novi processi progettuali: il fortunato connubio tra la complessità e gli strumenti digitali* in P. Ciorra, F. De Maio (eds.), *(Nuova) identità europea = (New) European identity*, Marsilio, Venezia 2011, pp. 214–219.

deconstructivism itself, of which it is but a mere evolution or involution. Parametricism taken as an ideology or as a technique is to a large extent ‘the refuge of the incompetent’, of those who do not know about form, about the laws of composition. In fact, those who speak only of instrumental techniques do not speak of Architecture but only of *téchne*, not of ends nor of presuppositions, being in fact committed and bent to praxis alone, to the market, to the production of captivating but in fact aggressive images, of simulacra, of phantasmagorias (from *phántasmata*) and of ‘smooth and glittering’ involutions<sup>19</sup>, very close to sculpture that have no other goal than to turn themselves into merchandise to be sold on the altar of profit. To use any tool or instrument, one must have a stance on architecture, and it is only from that stance that one can then select the technical equipment to develop it. In the frequent accusations of an inability to govern recent tools levelled at those who criticise them, there is never a single statement about the ‘what’ or the ‘how’ or about what idea of architecture parametricism would underlie. In my opinion, there is none because in the unregulated experimentalism that drives it, the new style, or rather the new ‘-ism’ in renouncing a synthetic thought founded on the form exiled from its laws, relies on mere events, constraints, with non-predictable outcomes, surprising because ‘by surprise’. This happens because one does not really have an idea of Architecture, or because one does not possess planning skills, ideational-inventive aptitudes, and one thinks that through a mere surrogate/successful and perniciously dominant tool – as all techniques turn from means into ends – one can overcome, hide this obvious inaptitude.

## THE PROJECT AS A SYSTEM OF CHOICES ABOUT FORMS

The project, on the other hand, is a predictive system of choices about forms and their appropriateness, not about arbitrary constraints that then determine the forms in a non-predictable manner. The insurmountable limit of parametricism ultimately consists in relying on a questionable system of re-requirements, constraints and parameters and in not being able to determine, except by random, unconscious and unintelligible trials, the final outcome. A system that, with the blunder of the self-generative grammar of shape, does not allow the convenient, adequate and intelligible forms, and for this reason *à-la* Benjamin, capable of generalised reception, in their non-automatic but intentional relationship, to be expressive of the value and reason of buildings. In short, we must re-educate people to see with the eyes of the mind as a transcendental condition of knowing and transforming reality through forms, otherwise it is better, avoiding the deception of parametricism, to crumple sheets of paper, scan them and three-dimensionally model them with Catia™...

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#### A u t h o r ’ s N o t e

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