

Przemysław WOJSZNIS

Politechnika Wrocławska Wydział Architektury
Zakład Geometrii Wykreślnej i Perspektywy Malarskiej W1/Z6
ul. Bolesława Prusa 53/55, 50-317 Wrocław
Tel. 606370708, przemyslaw.wojsznis@pwr.wroc.pl

GEOMETRIC PARAMETRIC MODELING IN ARCHITECTURAL DESIGN.

Architectural designing using parametric models has become one of everyday techniques among the architects in the high developed countries. The biggest architectural studios, like Foster and Partners, HOK Sport, Arup, Grimshaw+Partners, Zaha Hadid architects, Frank Gehry or Aedas are using the parametrical models in the their architectural concepts of surfaces, glass ELEWACJA or roofs of designed objects.

What is the difference then between the parametric and the usual 3D model?

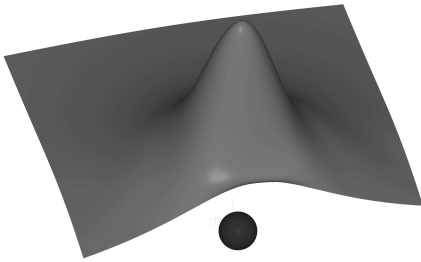
Designing the parametric model in architectural software relies on adding the elements connected with the already existing using knots or with the help of mathematical equations. Any change of any of elements, on every designing step, for example KRATOWNICY DACHU, influence all elements connected with this one. Every change of almost finished concept does not require demanding interference in other elements connected with the changed object, what is happening in the case of statical model. All actions are automatic. It is so called dynamic model. We can vary the created model in any possible way, scale out, extend, and change the parameters, data finding the best solution for both the investors and the architects.

Simultaneously, larger demand downs the costs of creating architectural models by printing them on 3D printers or molding CNC machines what causes easier access for these solutions. On the other hand, there is a great attitude in industry to the architects and constructors using the 3D models with the ready record of the elements directly to the fabricating device. It drops down the costs and eliminates errors during creating the realistic objects and from another point of view, information from industry about the possibilities of creating the ready models allows to solve the problems like connections or diving the space double curved for the flat elements on the glass surface.

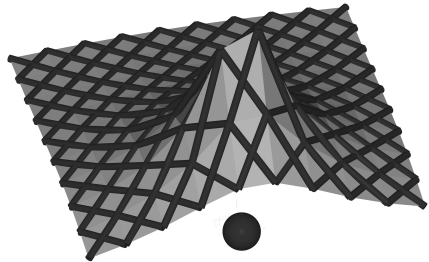
One of the first object, where the parametric models were used, were buildings of Swiss Re in London (designed by Foster and Partners, 2004), shopping centre O2 in Birmingham (Future Systems, 2003) and Kunsthhaus in Graz, Austria (Peter Cook + Colin Fournier, 2003).

Obviously, for creating such models the backup among the architects, constructors as well as the software is essential. The Architectural Association School of Architecture [1] and Faculty of the Built Environment [2] is one of the leaders on educating on this field.

Within this work, examples of parametric geometric models will be presented. The theoretical model will be realized by printing and cutting-out template devices as well as printing 3D model



b)



b)

Figure 2.: Parametric model a) surface b) truss changed using a sphere.

References:

- [1] www.aaschool.ac.uk.
- [2] www.bartlett.ucl.ac.uk.