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APERIODIC TESSELLATIONS IN SHAPING THE STRUCTURAL SURFACES IN THE CONTEMPORARY ARCHITECTURE

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Contemporary trends in surface subdivision used in architecture refer to the known principles of mathematics and geometry, which are a simplified imitation of the surrounding nature. Tessellation, which rely on filling the surfaces or space with repeating geometric motive, play an important role in the discretization of curved architectural forms. The use of polygon tessellation in the process of division irregular and complex surfaces is less frequently. More fascinating in search of effective engineering solutions are aperiodic tessellations, whose characteristic fractal structure is more analogous to the technology of Nature. One of the most interesting direction in the development of contemporary architecture is inspiration by nature, expressing in imitation of biological processes and construction of organic structures. The purpose of these activities is to search for the original architectural forms, shaped in logical way, particularly focused on the efficiency in the use of material and energy. Development of digital tools, especially the use of algorithms in 3D modeling software program, allows the generating of complex systems, also using a morphogenesis process.

In the era of generative design methods, the use of aperiodic tessellations provides a new creative tools in the design of planar and spatial rod shaped structures. An example of the application of non-periodic divisions in the generative modeling is Danzer script, that allows to generating forms based on the seemingly chaotic structure of the quasi-crystal.

Along with algorithmisation of 3D modeling software program, the use of construction of unobvious and chaotic biological structures, creates new opportunities for interdisciplinary and creative architectural design. The use of aperiodic tessellations in the modeling of rod structures and generating subdivisions of structural surfaces, leads also into synergetic solutions in architectural and structural design.