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THE FIRST RESOURCE FOR MATHEMATICS

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Formulations. Architecture, mathematics, culture. (English) Zbl 1504.00001

Writing Architecture Series. Cambridge, MA: MIT Press (ISBN 978-0-262-54300-2/pbk). 432 p. (2021).

The author describes how the design component in architecture, art and in other aspects of society was influenced by the technological and mathematical evolution mainly in the 20th century until the computer took over around 1960–1970 as a basic design instrument. Of course the influence is mutual, application problems trigger mathematical and technological solutions, but that is here less explicit.

As more computational procedures became available, they could be hidden in mechanical instruments, and later in software. That freed the designer from the computational burden so that more attention could go to the creative aspect of the job.

Some examples: triangulations, projections, or projective geometry are essential for evolutions in computer graphics, GIS systems, or perspective drawings. Similarly, grids, pixels, and voxels are heavily used to construct visual discrete models in many applications, but with topology, non Euclidean geometry, and transformations, more smooth, organic models became fashionable in art and structural design. Networks and dynamical systems are used in traffic and urban design, social coherence, biology and medicine.

There are many mathematical topics discussed in the book, but it is not a mathematical book although the 3D plot of the Riemann-zeta function on the cover might suggest differently. There are no formulas or popular mathematical theories, just some philosophical analysis of the epistemological aspects, mainly in architectural design, as influenced by the technological and mathematical evolution. The designer draws from a broad network of knowledge and insights, in which mathematics, although important, is just one of the ingredients. Since design is mainly experienced visually, the book has many illustrations, not only of architecture and art, but they also show how similar ideas penetrate into mathematics, chemistry, biology, or society in general.

Reviewer: Adhemar Bultheel (Leuven)

MSC:

00-02 Research exposition (monographs, survey articles) pertaining to mathematics in general
00A66 Mathematics and visual arts
00A67 Mathematics and architecture

Keywords:

architecture; visual art; geometry; history; topology; complex functions; technology; networks

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