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Mathematics and Polish Art in the 20th Century

Art and mathematics have never been completely separated. Both of them sought to explore the structure of the world and to develop sign systems and methods aimed at expressing reality, mysterious in its complexity, as well as to preserve intellectual processes propelling art and science. One of the most fundamental assumptions for this dissertation is a profound belief, established in recent literature, regarding existence of common area for art and science, wherein the 1950s division into two cultures, defined by Charles Snow, becomes obsolete. A research into artistic activities within the common area of art and mathematics seems to be a real challenge for art historians. It requires an interdisciplinary approach, but first and foremost a carefully selected methodology based on equality of art and mathematics, without any prejudices and exclusions.

Research problem outlined above in its broad context lays the foundations for the dissertation. Point of departure for my PhD thesis is a perception of the fact that mathematics for many Polish modern and contemporary artists was not only a loose source of inspiration, but also a wellspring for visual codes, a critical reference and even a language of their creative activity. The goal of the dissertation is to examine how the idea of reconciliation of art with modern mathematics' achievements was accomplished in the context of the 20th century Poland. To achieve this goal, it is absolutely critical to scrutinise (1) artworks of selected painters, sculptors and installation creators, who intentionally and clearly referred to exact sciences and their bedrock, i.e. mathematics; (2) discourse accompanying those artworks. The common area of art and mathematics underlying the thesis is an area of abstract properties, expressed in art in a visual way, whereas mathematics employs a notional manner. The dissertation proposes a few analytical categories in the light of which a historical and artistic narrative will be developed. In the virtue of this strategy the research problem gains an operational classification reflecting its dynamics and diversity.

It is difficult to find a fully developed methodology in art history that would be satisfying for this unique research subject, given a necessity to sustain a just relationship between art and mathematics. For this reason, the author of the thesis is compelled to put forward his own methodological proposition, which respects existing methods in the field of art history (for instance, Mieczysław Porębski's method inspired by information theory or Lynn Gamwell's cultural method). The author, a trained art historian and mathematician, would like to present a new methodological approach, called a 'scientific approach'. A project of scientific methodology is based on three main assumptions:

1. a Gilbert Simondon-inspired notion of congruence, meeting the requirements of structural relation of similarity between research subject and research method;
2. a translative assumption, according to which mathematical ideas need to be translated into art history language without necessity of evoking elaborated mathematical terminology in which those ideas were originally formulated;
3. a problem with (re)mathematisation of art, regarding the limits of mathematical concepts applicability to scientistic analysis of selected artists' works.

Only within the methodology outlined above it is reasonable to pose some research questions that are crucial to the dissertation: how should history of art referring to exact sciences be written? How did Polish artists visually represent mathematical conceptions which are non-visual in their essence? How were these artistic endeavours assessed by art critics, scientists, other artists etc? Is there a frontier of mathematics' visuality in art? What does mathematical art contribute to art history?

The presentation is divided into two parts. The first one is devoted to methodology – its inspirations, main issues and concepts. The second one encompasses an analysis of one specific category introduced in the thesis, namely a category of spatiality. A broad panorama of sources will be researched in order to examine the selected aspects of Leon Chwistek's, Ryszard Winiarski's and Jerzy Grabowski's artworks. In conclusion, some partial results will be presented.