

## **A Truly Existing “Extra-disciplinary” Architecture Design System —Analysis and Discussion on Ancient Chinese Architecture Practice Based on Algorithms**

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In the context of Western culture, Architecture is usually regarded as an independent discipline with its own boundaries. Researchers either try to dig inward within the boundaries or seek intersections outside the boundaries. But in another context, in ancient China, the design of architecture was based on algorithms (a branch of mathematics), which is obviously an independent system of extra-disciplinary. Facing the same topic, their answers are very interesting and inspiring.

First, based on the analysis of ancient documents and historical buildings, this paper introduces traditional Chinese architectural design based on algorithms.

Then, several relevant case studies are carried out to analyze the ancient architect’s design practice. Discuss their cognition and selection of the following topics: (1) the goal of architectural algorithm design, whether it is aimed at the architectural structure or non-tangible applications; (2) how to coordinate tangible structural elements and intangible elements such as society and economy in algorithm design; (3) how they collaborate between theoretical inquiry on architecture and professional practice routine;

Finally, based on the above research, comparing and analyzing Chinese and Western architectural systems, interpreting the two dimensions of architectural design as a place to live and as a tool of expression.

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Algorithm System of Large-Scale Buildings' Revealed in Ancient Book

"YingZaoSuanLi" (ancient craftsmen's book) can be regarded as a mathematical model. Its content includes the dynamic quantitative relationships between the dimensions of various building components rather than specific dimensions. It also includes the positional relationships between components and specific mathematical calculation methods. This book is acting as an order to guide the construction.

The Key Point of Mathematical Linking

- ① Large-Scale without Dougong
- ② Large-Scale without Dougong

