

Architecture Performance-Related Design Based on Graphic Parameterization

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Abstract : Architecture plane form is an important consideration in the design of green buildings due to its significant impact on energy performance. The most effective method to consider energy performance in the early design stages is parametric modelling. This paper presents a methodology to program plane forms using MATLAB language, generating 16 kinds of plane forms by changing four designed parameters. DesignBuilder (an energy consumption simulation software) was proposed to simulate the energy consumption of the generated planes. A regression mathematical model was established to study the relationship between the plane forms and their energy consumption. The main finding of the study suggested that there was a cubic function relationship between the depth-ratio of U-shaped buildings and energy consumption, and there is also a cubic function relationship between the width-ratio and energy consumption. In the design, the depth-ratio of U-shaped buildings should not be less than 2.5, and the width-ratio should not be less than 2.

Keywords : graphic parameterization, green building design, mathematical model, plane form

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