عنوان مقاله:
Topology Optimization, Theory, Methods and Applications in Architecture

محل انتشار:
کنفرانس بین المللی روشهای نوین طراحی و ساخت در معماری زمینه گرا (سال: 1393)

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خلاصه مقاله:
The human desire for accomplishment, demonstrates the optimization theory. Human wants to visualize and describe the best and achieve it. Optimization theory contains quantitative studies of optimal and methods to find them. An optimization problem consists of maximizing or minimizing a real function by systematically choosing input values from within an allowed set and computing the value of the function. Topology optimization is a mathematical approach that optimizes material layout within a given design space, for a given set of loads and boundary conditions such that the resulting layout meets a prescribed set of performance targets. Using topology optimization, engineers can find the best concept design that meets the design requirements.The nature learns us by evolution strategies in millions of years to use resources efficiently and to find the optimal shape. These organic forms determine structure of creatures. In years away some of designers and architectures had used natural forms in designing and manufacturing structures but these organic forms originated from those designers ingenuity. Now designers have tools to do this process for them. Use of topology optimization in the new design process leads in average to following result: 30% Less Mass, 30% Better Performance and 50% Cost Savings. The goal of topological optimization is finding the optimal lay-out in specified area and it carried out in three stages; selecting the design space, topology optimization and design of structural form. Using this tool is not only structurally considered, but optimized form achieves certain aspects of the aesthetics. Topology optimization has considerable potential in architectural design as the guide of creativity and the convergent principles of architecture and engineering. In this study we peruse the theory and method of topology optimization and its applications and its effects on existing samples by using correlate softwares.

کلمات کلیدی:
Architecture, Topology Optimization, Optimal Design, Structural Form, Organic Form

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