Adaptive Parametric Algorithm for Optimizing Non-Conventional Solar Screens for South-Oriented Office Facades in Cairo.

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Abstract

Parametric approach proved great potentials in generating various alternatives and overcoming traditional scenario-by-scenario limitations, especially when combined with simulation tools. Parallel parametric simulation was suggested as generative-evaluated tool to optimize solar screen driven by daylight and thermal performance in 8 times faster than default runs. This paper proposes an Adaptive-Parametric-Algorithm (APA) for Grasshopper (GH) based on parallel parametric simulation to directly generate optimized alternatives of non-conventional solar screen for specific target performance. APA uses Diva-for-GH to optimize various screen parameters for south-oriented office space in Cairo, Egypt. The results proved APA ability to achieve numerous screens alternatives efficiently that all comply with both LEED-V4 and IES within optimal thermal performance. Moreover, a selection criteria was proposed, that could indicate optimal screen configurations which balance daylight and thermal performance based on daylight simulation only.

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