Abstract

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100 Years of Daylighting: A Chronological Review of Daylight Prediction and Calculation Methods

Daylighting is a parallel universe to Architecture, where architects benefit greatly from daylight prediction techniques, which have witnessed a paradigm shift from simple methods to more sophisticated computational simulation tools. Still, such accumulating complexities made many designers disinclined to integrate what they consider difficult methods into their practices, even hindered the casual use of simulation tools, due to the lack of essential knowledge, among other complications. Herein, this research aims to provide a comprehensive review of over 100 years of growing fundamental directions to predict the amount of daylight inside buildings, with a particular focus on tracing sky models, weather datasets, building geometry and daylight calculation methods, which drove the progress of performance metrics and simulation tools, considering detailed descriptions of 50 prevalent simulation tools. This historical review is conducted with the architects’ nature in mind to underline existing knowledge gaps in the research domain and reveal future perspectives. Another implication of this research is to remove ambiguity of unfamiliar terms and technicalities, helping practitioners, especially young architects, of different backgrounds and expertise to grasp the essential daylight-related topics, guiding their decisions on suitable tools to use in building design.