

An integrated platform for building performance analysis using grasshopper

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ABSTRACT: Recent developments in building simulation software, coupled with increasing availability of computing power, are allowing architects to effectively move performance analysis of designs into the early stages of the design process. These developments aim to allow for the rapid iteration of design solutions, along with more holistic evaluations that examine various performance criteria of interest in a simultaneous fashion. However, different performance criteria require different modes of analysis, and it is also critical for the user to obtain confidence in the simulation results. This paper describes a prototype tool created using Grasshopper, a visual programming language integrated within the Rhinoceros CAD application that can serve as a platform to merge large amounts of building performance simulation data coupling various performance criteria. A case study is described using the tool where the heat and moisture performance of different wall assemblies are evaluated in parallel. The results are linked to a process that aims to quantify the range of uncertainty surrounding the results, so that the user is able to guide the choice of design parameters in a more accurate manner. The conclusions show that key insights can be quickly obtained using this tool, demonstrating its potential to increase understanding of building performance. Outcomes of this work can also advance the building science knowledge through the development of a novel framework that ties different design-driven performance metrics.