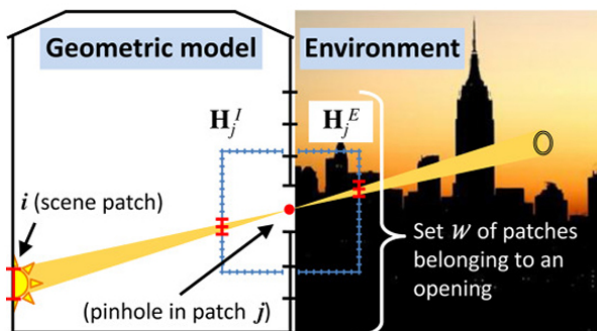


A Fast Daylighting Method to Optimize Opening Configurations in Building Design

Fernandez, Eduardo; Beckers, Benoit; Besuievsky, Gonzalo



Daylighting plays a very important role for energy saving in sustainable building, therefore, setting the optimal shapes and positions of the openings is crucial for daylighting availability. On the other hand, computing daylighting for climate-based data is a time-consuming task involving large data set and is not well suited for optimization approaches. In this paper we propose a new and fast daylighting method that allows to perform opening shape optimizations. The base of our method is to model each element of an opening surface as a pinhole and then formulate a compact irradiance-based representation to ease global illumination

calculations. We use the UDI metric to evaluate our method, on an office-based model, for different orientations and different geographical locations, showing that optimal windows shapes can be obtained in short times. Our method also provides an efficient way to analyze the impact of climate-based data on the shape of the openings, as they could be modified interactively.