Procedural models to better compute solar flux at the neighbourhood scale

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The aim of this paper is to define the optimal Level of Detail (LoD) of an urban 3D model for solar energy simulation at the neighbourhood scale. Procedural methods are used to build the geometry. They allow modifying easily the Level of Detail of the windows (first application) and of the roofs (second application). Simulations of direct solar irradiation and Sky View Factors are applied to the model, and the accuracy of the results is compared at different levels. The results show the good behaviour of intermediary LoDs, which should allow the handling of large urban models. Further steps of this research should conduce to establish dynamic LoD procedures, respecting the skyline and allowing an evaluation of the error. This method could be transposed to other fields of the urban physics.

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