Inverse lighting design for interior buildings integrating natural and artificial sources

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In this paper we propose a new method for solving inverse lighting design problems that can include diverse sources as roof skylights or artificial light sources. Given a user specification of illumination requirements, our approach provides optimal light source positions as well as optimal shapes for skylight installations in interior architectural models. The well known huge computation effort that involves searching for an optimal solution is tackled combining two concepts: exploiting the scene coherence to compute global illumination and using a metaheuristic technique for optimization. Results and analysis show that our methodology presents fast and accurate results and that it can be applied for lighting design in indoors environments with interactive global illumination visualization support.

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