Low-Rank radiosity using sparse matrices

Fernandez, Eduardo

Radiosity methods are part of the global illumination techniques, which deal with the problem of generating photorealistic images in 3D scenes with Lambertian surfaces. Low-rank radiosity is a $O(nk)$ method, where $n$ is the number of polygons and $k$ is the rank of the matrix used as a direct transport operator. This method allows calculating, in real-time and with infinite bounces, the illumination of a scene with static geometry and dynamic lighting. In this paper we present a new methodology for low-rank radiosity calculation based on the use of sparse matrices, which significantly reduces the memory storage required and achieves speedup improvements over the original low-rank method. Experimental analysis was performed in both traditional computers and new graphics processing unit architectures.

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