Penumbra Maps

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Technical Report UUCS-03-008

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April 23, 2003

Abstract

Generating soft shadows quickly is difficult. Few techniques have enough flexibility to interactively render soft shadows in scenes with arbitrarily complex occluders and receivers. This paper introduces the *penumbra map*, which extends current shadow map techniques to interactively approximate soft shadows. Using object silhouette edges, as seen from the center of an area light, a map is generated containing approximate penumbral regions. Rendering requires two lookups, one into each the penumbra and shadow maps. Penumbra maps allow arbitrary dynamic models to easily shadow themselves and other nearby complex objects with plausible penumbrae.