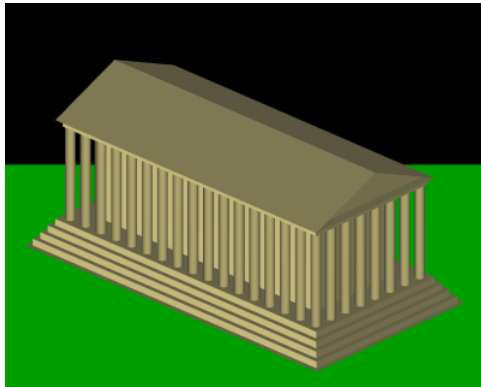

Shadow Maps

Hubert Mohr-Daurat

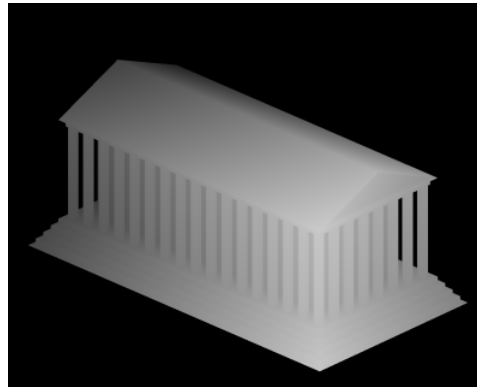
KAIST (Korea Advanced Institute of Science
and Technology)



Recall on shadow mapping

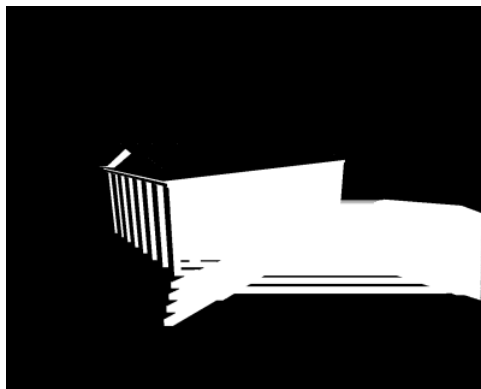


1. Rendering from the light's point of view

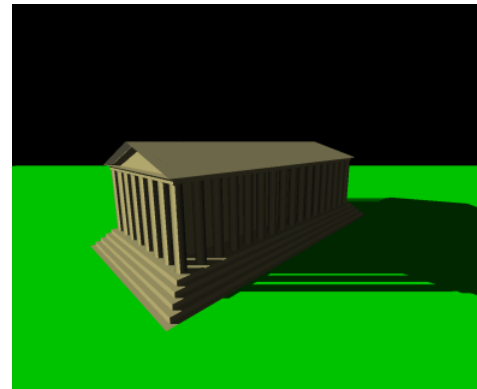


2. Creation of the shadow map

Light's
point of view



3. Comparison
pixel by pixel



4. Final rendering
with shadows

Camera's
point of view

First Problem

- **Aliasing**
 - From the difference of resolution between the shadow map and the generated image
- **Two possible solutions :**
 - **Perspective Shadow Maps**
(Marc Stamminger and George Drettakis, SIG 02)
 - **Sample Based Visibility for Soft Shadows using Alias-free Shadow Maps**
(Erik Sintorn, Elmar Eisemann, Ulf Assarsson, EGSR 08)

Second and Main Problem

- **Need soft shadows**
 - **Multiple light sources**
 - **Extended light sources : light can be partially occluded**
- **Hard shadows \neq Soft shadows**
 - **Hard shadows : pixels are either visible or hidden**
 - **Soft shadows : pixels can be in *penumbra***
- **Key role for realism**

Solutions (1/3)

- **Sample Based Visibility for Soft Shadows using Alias-free Shadow Maps**

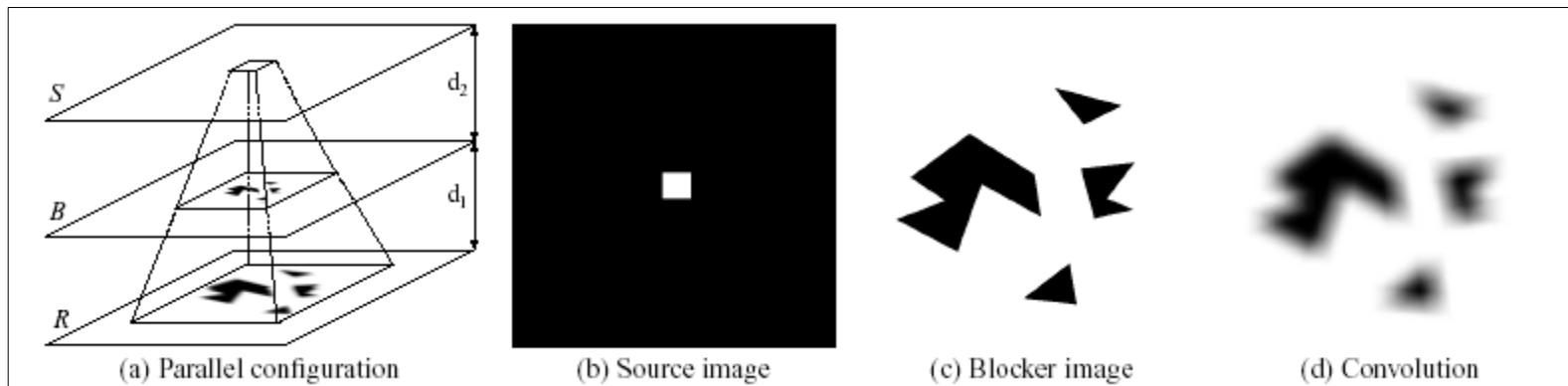
(Erik Sintorn, Elmar Eisemann, Ulf Assarsson, EGSR 08)

- **Optimal computation of soft shadow from the algorithm used for hard shadows**
- **Consider extended light and multiple light sources**

Solutions (2/3)

- **Fast Calculation of Soft Shadow Textures Using Convolution**

(Cyril Soler and François X. Sillion, SIG 98)

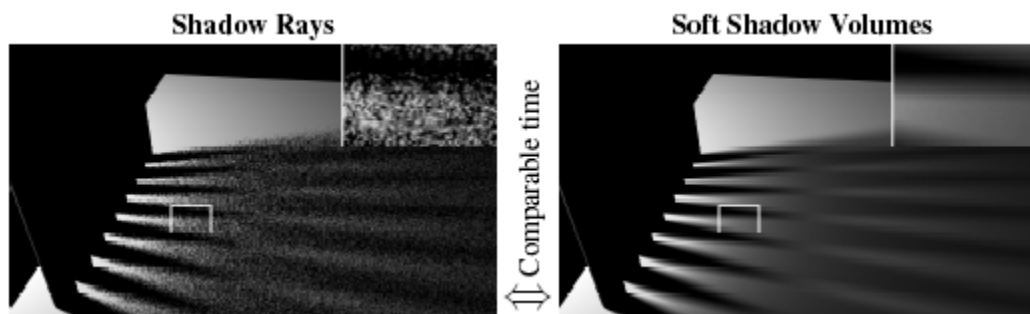


- **Real-Time, All-Frequency Shadows in Dynamic Scenes**

(Thomas Annen, Zhao Dong Tom Mertens, Philippe Bekaert, Hans-Peter Seidel, Jan Kautz, SIG 08)

Solutions (3/3)

- **Soft Shadow Volumes for Ray Tracing**
(Samuli Laine, Timo Aila, Ulf Assarsson, Jaakko Lehtinen, Tomas Akenine-Möller, SIGGRAPH 2005)
 - Do not use shadow maps
 - Improve stochastic ray tracing



Conclusion

- **All the algorithms obtain good quality and at the same time efficiency**
 - **some for offline rendering**
 - **some for real-time rendering**
- **Those methods are not made for global illumination but could be adapted**