Integro-Approximation with Neural Integral Operators

Alexander Keller
NVIDIA
`akeller@nvidia.com`

Coauthor(s): Christoph Schied

Real-time rendering imposes strict limitations on the budget of sampling-based algorithms for light transport simulation, resulting in noisy images. Yet, denoisers demonstrate that there is sufficient information to create noise-free images by filtering. We improve image quality by removing noise before material shading rather than filtering already shaded noisy images. This allows for material agnostic denoising (MAD) and is enabled by machine learning: We evaluate the light transport integral operator by a neural network. The new method runs in real-time, requires only data from a single frame, is easily combined with existing denoisers and temporal anti-aliasing techniques, and is efficient to train. It is straightforward to integrate with physically based rendering algorithms.