Generating Random Segments from Non-Uniform Distributions

Eric Heitz

▶ To cite this version:

Eric Heitz. Generating Random Segments from Non-Uniform Distributions. [Research Report] Unity Technologies. 2018. hal-01745725
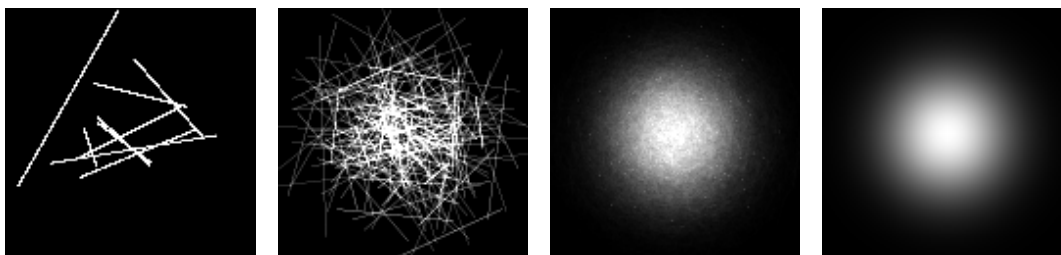
HAL Id: hal-01745725

https://hal.archives-ouvertes.fr/hal-01745725

Submitted on 28 Mar 2018

Generating Random Segments
from Non-Uniform Distributions

Eric Heitz

Unity Technologies

Abstract

We investigate the generation of random segments from non-uniform distributions, i.e. we aim at designing methods that generate random segments such that the density of these segments converges towards a target distribution as the number of segments increases.

The motivation for this study is that recent research has shown that random segments can yield superior results than random points for Monte Carlo integration. Currently, an important limitation of this research area is that random segments can be generated only from uniform distributions, typically over a rectangular or circular domain.

The focus of this presentation is to overcome this limitation by introducing three methods for generating random segments from non-uniform distributions. Our algorithms are inspired by the point-sampling variants of rejection sampling, slice sampling and inverse-CDF sampling. We explain how to apply them on analytic distributions as well as arbitrary distributions such as images.