PxrCurvature

This is a simple and useful pattern for creating edge effects and curvature based results like wear on edges and objects in contact with other surfaces.

Parameters

Num Samples

Controls the number of samples used to calculate curvature. More samples can reduce the noise at the cost of increased render time.

Max Distance

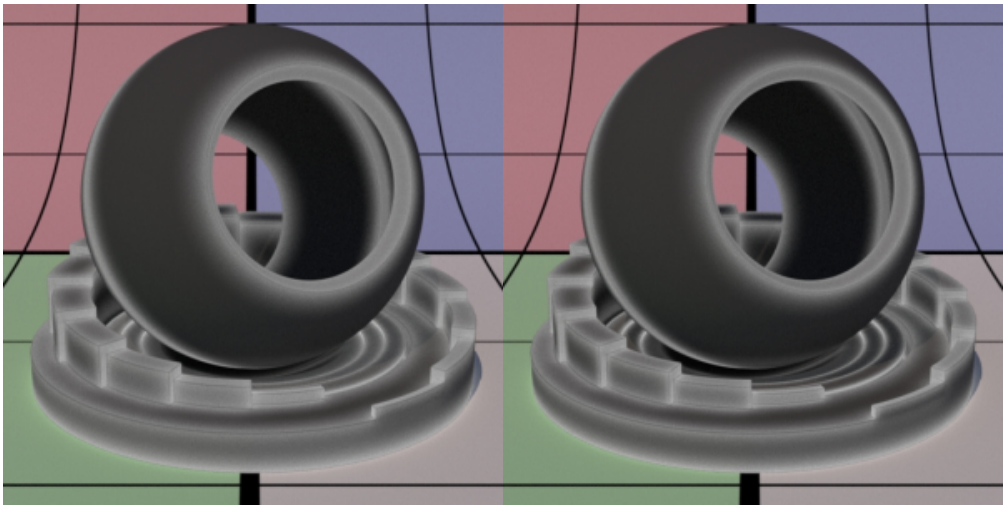
Samples travel a certain distance before being terminated. Lower values tend to generate sharper changes while larger ones spread out the effect and may lose details. Other objects may occlude as your distance becomes higher. Interiors are the most obvious way to see this effect. 0.0 means "infinite", or essentially your scene extent.

Trace Set

You may use Trace Sets to include other objects from the rays being traced. Helpful when you need a large Max Distance but don't want other objects occluding the result. Note this is not an exclusion, it's inclusion of the specified set.

Sample Distribution

Possible values are, in order, *uniform* and *cosine* (Lambertian).



	Description
Uniform	Rays are not weighted in any particular direction.
Cosine	Rays are weighted in the normal direction based on Cosine Spread parameter below.

Cosine Spread

Sample spread of rays when using *cosine* distribution. A value of 1.0 gives a perfect Lambertian distribution. Lower values shrink or "tighten" the effect along curves while larger amounts spread out the effect.

Bias

The bias will affect the falloff of the curvature and will be linear, decreasing with the distance from the shaded point. Bias can be used to take further samples into account more or less while nearby points have more weight.

- The closer to 0.0, only points closest to the shading point will contribute.
- With the default of 0.5 any points close to Max Distance will contribute less, and points close to the shaded point will contribute more.
- The closer to 1.0, the more all sampled points will contribute. At exactly 1.0 sampled points at all distances will contribute equally.

Convex Threshold

Increasing this parameter erodes the result, shrinking the visible effect.

Concave Threshold

Increasing this parameter erodes the result, shrinking the visible effect.

Output

Output Gain

A multiplier for the resulting curvature effect (areas without curvature are naturally unaffected)

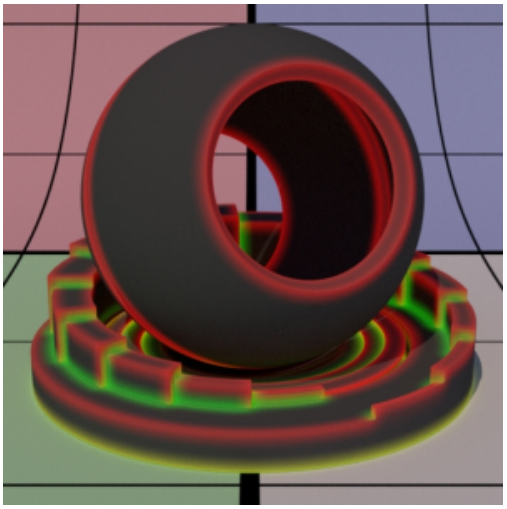
Output Type

Set to "Concave", only concave curvature will be output. Set to "Convex", only convex curvature will be output. "Both" will show both convex and concave curvature.

Both
Concave
Convex

Monochrome Output

The result is a simple white or greyscale value for both concave and convex results. Off outputs Convex as Red and Concave as Green



Clamp Output

Values are clamped to 0-1 ranges by default. If you require an expanded range (perhaps with the gain control or to drive another parameter connection) you can disable this.