Partition of unity parametrics for texture synthesis

Jacquelin Caron and David Mould

Abstract
Partition of unity parametrics (PUPs) are a recent framework designed for geometric modeling. We propose employing PUPs for procedural texture synthesis. Using PUPs to interpolate among data values distributed through the plane, the problem of texture synthesis can be approached from the perspective of point placement and attribute assignment.

Summary
PUPs-based textures properties:
- Arbitrary topology of control net
- Local support
- Control the weight with orientation (figures on the right)
- High-continuity interpolation
- Texture synthesis tasks is a point distribution tasks
- Creation of both stationary and non-stationary textures

Algorithm:
- Distribute points through the plane
- Each point has an associated value (color, intensity)
- PUPs interpolates the values over the plane to produce the texture

Results
Progressive textures
Iterative process
Spot textures
Cellular textures
Color assignment according to location
Perlin sum

References