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Conformal Models of Hyperbolic Geometry. Preliminary report.

We show different ways to visualize hyperbolic patterns using conformal transformations of the complex plane. Traditional Poincare model of hyperbolic plane has a lot useful properties, but has limited visual appearance. Image of a pattern in Poincare model is a circle with a few large images at the center and rapidly vanishing details toward the boundary. This is especially inconvenient for patterns with large fundamental domains. However, Poincare circle can be conformally mapped into a variety of shapes to produce quite different and interesting images. Several examples will be presented, in particular infinite band, ring, sector and a few more artistic shapes. Different mappings provide various visual advantages for pattern visualization. Infinite band for example visualize patterns with constant scale along the center line. The pattern visualization in the band model may be periodic along the band or exhibit infinite variety of shapes depending on where in the hyperbolic plane the axis of the band mapping is located. The band mapping also can be generalized for use in the visualization of 3D hyperbolic geometry. In that case the Poincare ball is stretched into an infinite cylinder. This mapping is quasi-conformal with the anisotropy factor close to one. (Received September 18, 2009)