

Capstone Project - The Gauss Bonnet Theorem

Gene Lu

May 2, 2024

1 Abstract

We begin by proving the Gauss-Bonnet Theorem in hyperbolic space. We then generalize this theorem to any hyperbolic n -gon in the upper half plane, and show that it holds true for any model of the hyperbolic plane. We compare it to the same result in differential geometry and show that they are indeed equivalent. Finally, we describe the applications of this theorem in hyperbolic geometry as well as in computer graphics.