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GAUSS BONNET ON 2-ORBIFOLD

Zongyi Li and Bohan Lu

Mentor: Xiang Tang

This summer we researched on 2-orbifold Gauss-Bonnet Theorem. The Orbifold Gauss-Bonnet theorem has been first developed by Sakate in 1957. In this program, we studied textbooks and papers on topology and geometry, and rediscovered these interesting theorems of orbifolds. In the first half of the research, we reviewed the classical Gauss-Bonnet theorem on smooth Riemann surfaces; in the second half, we presented an elementary proof of the Gauss-Bonnet theorem on orbifold Riemann surfaces. Specifically, we give detailed proofs of 1. classical Gauss-Bonnet theorem, 2. classification of finite subgroups of $O(2)$, 3. Integral of curvature on 2-orbifold is well-defined, and 4. Gauss-Bonnet for compact 2-orbifold, along with plenty of examples and illustrations.