Abstract

The aim of this THESIS is to highlight the major developments in the arithmetic-geometric aspects of the modular group. After covering geomet- ric aspects of Fuchsian groups, we study various variants of the Poincar´ e polygon theorem. Arithmetic methods like Farey Symbols have been used to describe the subgroups of P SL(2, Z). Graph-theoretical approach has been used to study algorithm for generating all trivalent diagrams. Finally, we conclude by describing algorithms for testing membership of matrices in P SL(2, Z) by using the concept of Farey Symbols.