

Abstract

A very fundamental problem in topology is to find whether two topological spaces are homeomorphic or not. This problem cannot be solved using purely topological tools only. Algebraic topology originated to develop tools to deal this problem using algebraic methods. Fundamental group is a very basic and one of the most important invariants of a topological space. In the first chapter, some basic concepts like CW complexes, fibration and H-spaces are defined, which will be used in the later chapters. In the second chapter, homotopy groups are defined and some of their properties are discussed. Some computations are done for spheres. In the last chapter, we discuss an important subgroup of the fundamental group of a space. These groups were defined by Daniel Henry Gottlieb in 1965. Following Gottlieb [2], we discuss some properties of these groups and compute them for some nice spaces such as lens spaces, projective spaces and two dimensional manifolds.