

CHAPTER 1

The first part of the book is devoted to the study of the basic concepts of the theory of groups. In this chapter, we shall discuss the definition of a group, the properties of groups, and the construction of quotient groups. We shall also discuss the concept of a normal subgroup and the First Isomorphism Theorem for groups.

The second part of the book is devoted to the study of the theory of rings and modules. In this chapter, we shall discuss the definition of a ring, the properties of rings, and the construction of quotient rings. We shall also discuss the concept of a module and the structure theory of modules. We shall also discuss the concept of a principal ideal domain and the structure theory of modules over a principal ideal domain.

The third part of the book is devoted to the study of the theory of fields and Galois theory. In this chapter, we shall discuss the definition of a field, the properties of fields, and the construction of quotient fields. We shall also discuss the concept of a Galois extension and the Galois group of a Galois extension. We shall also discuss the concept of a normal extension and the Galois correspondence.

The fourth part of the book is devoted to the study of the theory of vector spaces and linear transformations. In this chapter, we shall discuss the definition of a vector space, the properties of vector spaces, and the construction of quotient vector spaces. We shall also discuss the concept of a linear transformation and the matrix representation of a linear transformation. We shall also discuss the concept of a similarity transformation and the Jordan normal form of a matrix.

The fifth part of the book is devoted to the study of the theory of bilinear forms and quadratic forms. In this chapter, we shall discuss the definition of a bilinear form, the properties of bilinear forms, and the construction of the matrix representation of a bilinear form. We shall also discuss the concept of a quadratic form and the classification of quadratic forms. We shall also discuss the concept of a symmetric bilinear form and the spectral theorem for symmetric matrices.

The sixth part of the book is devoted to the study of the theory of linear differential equations. In this chapter, we shall discuss the definition of a linear differential equation, the properties of linear differential equations, and the construction of the fundamental system of solutions. We shall also discuss the concept of a homogeneous linear differential equation and the method of variation of parameters. We shall also discuss the concept of a non-homogeneous linear differential equation and the method of undetermined coefficients.

The seventh part of the book is devoted to the study of the theory of partial differential equations. In this chapter, we shall discuss the definition of a partial differential equation, the properties of partial differential equations, and the construction of the method of separation of variables. We shall also discuss the concept of a homogeneous partial differential equation and the method of separation of variables. We shall also discuss the concept of a non-homogeneous partial differential equation and the method of undetermined coefficients.

The eighth part of the book is devoted to the study of the theory of integral equations. In this chapter, we shall discuss the definition of an integral equation, the properties of integral equations, and the construction of the method of successive approximations. We shall also discuss the concept of a homogeneous integral equation and the method of successive approximations. We shall also discuss the concept of a non-homogeneous integral equation and the method of successive approximations.

The ninth part of the book is devoted to the study of the theory of differential equations in the plane. In this chapter, we shall discuss the definition of a differential equation in the plane, the properties of differential equations in the plane, and the construction of the method of separation of variables. We shall also discuss the concept of a homogeneous differential equation in the plane and the method of separation of variables. We shall also discuss the concept of a non-homogeneous differential equation in the plane and the method of undetermined coefficients.

The tenth part of the book is devoted to the study of the theory of differential equations in three dimensions. In this chapter, we shall discuss the definition of a differential equation in three dimensions, the properties of differential equations in three dimensions, and the construction of the method of separation of variables. We shall also discuss the concept of a homogeneous differential equation in three dimensions and the method of separation of variables. We shall also discuss the concept of a non-homogeneous differential equation in three dimensions and the method of undetermined coefficients.

