The Second Lecture

Some Examples

In this lecture we give some examples about groups, such as (Z,+), (Q\{0},.), Sn with the composition operator and Boolean group.

Examples:

(i) (Z,+); The set of all integers is an additive abelian group with identity *e*= 0, and with the inverse of an integer *n* being - n.

(ii) Similarly, one can see that (Q,+) and (R,+) are additive abelian groups, where Q is the set of rational numbers and R is the set of real numbers.

(ii) (Q\{0}, .); The set of all nonzero rational numbers, is an abelian group, where (.) is the ordinary multiplication, the number 1 is the identity, and the inverse of r is 1/r . Similarly, (R\{0},.) is a multiplicative abelian group.

(iii) Let X be a set. Recall that if *A* and *B* are subsets of X, then their symmetric difference is A B=(A-B)□ (B-A).The **Boolean group** P (X) is the family of all the subsets of *X* with addition given by symmetric difference.

(iv) Consider *Sn* , the set of all permutations of *X* = {1, 2, . . . , *n*}. It is form a group with the composition operation.

Remark: Let G be a group, let a, b G, and let m and n be (not necessarily positive) integers.

(i) If a and b commute, then (ab)n= an bn.

(ii) (an)m = amn .

(iii) am an = am+