

MA-434: ADVANCED GROUP-THEORY

Actions of Groups, Permutation representation, Equivalence of actions, Regular representation, Cosets spaces, Linear groups and vector spaces.

Affine groups and affine spaces, Transitivity and orbits, Partition of G -spaces into orbits, Orbits as conjugacy class Computation of orbits, The classification of transitive G -spaces Catalogue of all transitive G -spaces up to G -isomorphism, One-one correspondence between the right coset of G_a and the G -orbit, G -isomorphism between coset spaces and conjugation in G .

Simplicity of A_5 , Frobenius-Burnside lemma, Examples of morphisms, G -invariance, Relationship between morphisms and congruences, Order preserving one-one correspondences between congruences on Ω and subgroups H of G that contain the stabilizer G_a .

The alternating groups, Linear groups, Projective groups, Mobius groups, Orthogonal groups, unitary groups, Cauchy's theorem, P -groups, Sylow P -subgroups, Sylow theorems, Simplicity of A_n when $n \geq 5$.

RECOMMENDED BOOKS:

- a) J.S. Rose, A Course on Group Theory, Cambridge University Press, 1978.
- b) H. Wielandt, Finite Permutation Groups. Academic Press, 1964.
- c) J.B. Fraleigh, A Course in Algebra, Addison-Wesley 1982.