

MA-625 LOOP GROUP (Prerequisite: M-609)

Finite dimensional Lie groups: Complex Groups, Compact Groups, Root Systems, Weyl Groups, Complex Homogeneous Spaces, Borel-Weil theorem.

Groups of Smooth maps: Infinite dimensional manifolds, Groups of maps as infinite dimensional Lie groups, The Loop group $L(G) = \text{Maps}(S^1, G)$ and its basic properties.

Central extensions: Lie algebra extensions, the Co-adjoint action of the loop group on its Lie algebra, Kirillov method of orbits, group extension of simply connected Lie groups, Circle bundles, Connections and curvature.

Kac-Moody Lie algebras: The affine Weyl group and its root system, Generators and relations.

RECOMMENDED BOOKS:

1. A. Pressley and G. Segal., Loop Groups, Oxford University Press, 1986.
2. V.G. Kac, Infinite Dimensional Lie Algebras, Birkhauser, 1983.