

Some Notes on Groups, Symmetries, Differential Geometry, and Splitting Techniques in the Context of General Relativity

For Application to Cosmology, Black Holes, Isolated Source Spacetimes, and the Dynamics of Gravitation as well as to Modern Topics in Theoretical Physics

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Contents

A Second Look at Tensors, Covariant Differentiation and Curvature (SL)

Curvilinear Coordinates and Curvature (CCC)

Introduction to Cosmological Models (ICM)

Part I: orthogonal coords on flat or constant curvature manifolds with metric, FRW geometry, simplest spacetime splittings, Gaussian normal coords, intrinsic and extrinsic curvature

Part II: Symmetries and Lie groups

Part III: Differential geometry, Classical mechanics, matrix groups, rigid body dynamics

Part IV: Fiber-bundles, gauge groups

Part V: Anisotropic cosmological models, gravitational dynamics

Spacetime Splitting (SS)

Symmetry Breaking in Cosmology (SB)

Spacetime Splitting '96: Tensor Harmonics (and Gravitoelectromagnetism) (SS96)

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June 1996 extract of
1) ICM Parts I, II
2) then later SS & SB
3) SS96 new