

Lecture 4 — Manifolds and Curved Spacetime

Michael Brodskiy

Professor: J. Blazek

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- We now move from Minkowski to General Space:

$$\eta_{\mu\nu} \rightarrow g_{\mu\nu}$$

- Differentiable Manifolds
 - Manifold: A space (in n -dimensions) that looks locally like \mathbb{R}^n and can be constructed by smoothly stitching together these regions
 - Rotations in $\mathbb{R}^n \rightarrow$ Lie Groups are manifolds with a group structure
 - To be more precise, we have a set M with a set of (all possible) charts of open subsets to \mathbb{R}^n
 - * Chart \leftrightarrow coordinate system
 - These charts must be smooth, continuous, invertible, and differentiable