

0.1 Covariant derivative

Essentially as we move across path, we are changing the basis.

We can look at how basis vector change as we translate

We can define as basis as:

$$e_i = \frac{\partial x}{\partial x_i}$$

How to measure transport

If we take a vector and move it around a curved surface and return it to the same point, it may not face the same way

Eg if you're on equator, move east, north, south to equator, you'll face different direction

This is true on smaller movements of a curved surface

We can use this to measure curvature of a manifold without coordinates

0.2 New

covariant derivative. how does change in field compare to parallel transport from current position?

$$\nabla_v (X) = \nabla_{t0}$$

We have point p . We can compare how field in tangent space varies in direction of v .

we don't define basis as each point, but rather how basis changes as you move along a curve