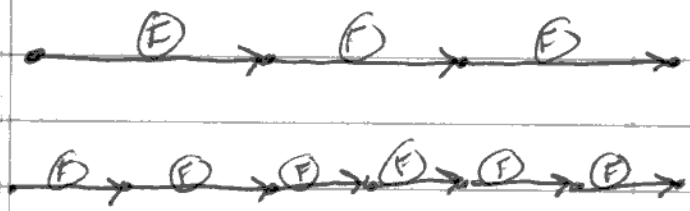
Particle ↔ Graph ↔ structure

Linear
Dimension
Has Particles
that differentiate
forward and back



(1) Dimension exists or Coexists at multiple scales

(2) Scales can be evaluated by algorithm that is scale independent by focusing on (F) the particle that indicates forward

Using Particle mechanism to establish a structure

Dimension (minimum # coordinates to specify a point)

Space

Coordinates

orthogonal

Point — element of some set called a space

axis

Space = set w/ some added structure
→ hierarchy of spaces

Spaces are mathematical structures

Isomorphism - 1 to 1 correspondence between spaces

Each axis is an orthogonal independent linear structure.

A space is a set of elements where one element exists for each combination of elements from the axis structures

Domain

type theory

Mathematical structure

structure on a set

a type

mathematical objects that attach to a set

algebraic structures — axioms

topological structures

diffeomorphisms — differential structures

abstract object — object = "thing being observed"

physical referent

mappings

topological space

set of points

set of neighbourhoods for each point

axioms relating points and neighborhoods

Continuity
Connectedness
Convergence