There is a clear distinction b/w physical and mathematical objects. Mathematical objects are virtual objects that mimic the real behaviour of observed objects Say an electron The behavior of an election within an atom can be described by the mathematical equations described by debrogic, Born and Schrödinger, but does not describe the actual phyrical porticle. a particle such as a quark does not travel in a continuous, straight line If it exists in a sphere of influence with radius pm at time to 1ts. conter of influence snaps to a point on the surface of the sphere, this point on the surface is the control a different sphere and the time period snaps" from to to to+8t making of the minimum "renderable" time period and making of the minimum "renderable" universal distance. Postulate -> the universe can be seen as a higher dimensional manifold. The "snapping" points are the points where this n dimensional manifold, power through intersects the 1yzt ous. Mathemat only The 4-d projection of the univose represents the roots of the month Action principle once again change to SIL (1, 1, 1, ti) At Sm Sind L (Ji) At DL(11, V1)\_ DL(21-1, V1) 1 + DL(1, V1) 1 50 By bossiple grady dioby ony particle with not enough memortule to snap to the new point settle back to that said point. the Vegured activation energy needed to snap increases with Mary Uobs = Upep (x & R1,3 | Fp(x)=0) P is the set of all particles that have ever existed. Let M be an unaouble, differentiable N-dimensional manifold (N>4) representing the total state space of the universe Each point me m encodes a possible complete configuration of reality. P: M -> 1R"3 (Projection) That physically realized universe is the countable set Volu For IRIJ - IR is a smooth function whose voots define the spacetime croils where a portide p is present  $E_{\rho}(x) = \begin{cases} | & \text{if } F_{\rho}(x) = 0 \\ 0 & \text{otherwise} \end{cases}$ existence is boolean and the 30/40 universe is a countably infinite subject of M Each particle in Courtes its own intrinsic parameter Tp EIR It's spap sequence is a divote ordered set Tp = 1mp, 0, mp, 1, mp, 2 y CM With Corresponding projections  $\chi_{p,i} = P(m_{p,i}) \in \mathbb{R}^{1,3}$ which gives the particles observed spacetime trajectory as a countable train of events. Activation function and shap rate. A  $M \times T^* M \to IR$  that depends on both location  $M \in M$  and the particles momentum  $p_M \in T^* m M$ . The snap Kate (conversion from intrinsic to observed fine) is dip = g (A (mp,i , pm)) where g is a smooth, monotopic fundin thosen such that in the weak-field limit. dt = | 1+2 = (1) \_v recoverly grantation and hinematic fine dialation, Discrete Acton principles Sp = S, L (Xp.i, Xp.i+1-Xp.i, A (Xp.i, pm)) ATp,i
ATp,i where Lis the lagrangian density evaluated on each snap segment The actual map sequence of minimizes (or extremizes) of: SSp=0 which yields Eulo- lagrange Equations:  $\frac{\partial L_{i}}{\partial L_{i}} = \frac{1}{\Delta T_{i}} \left( \frac{\partial L_{i}}{\partial V_{i}} - \frac{\partial L_{i-1}}{\partial V_{i-1}} \right)$  In the limit  $\Delta T_{p,i} \rightarrow 0$  the converges to the usual confinuous Euler logrange and recover classical mediants /GR geodusis Probability of map Define a path measure In the quantom vegine many P[ [p] x exp( L Sp[ [p]) In the classical regime too, stationary-phase approximate priche out the least-ach This Unifice Classical and quantum Mechanics undo a simple Frame work Gravity by a Poisson-like eyesti- $\nabla^2 A(m) \propto \rho(m)$  whose y(m) is the mass-energy density projected into M. The snap sequences curve towards regions of lower Areproducing geodesiz motion in curved spacetime when outward snap probability or, event horizon is created. Minimur Spap dutora. State dependent map resolution: Abmin (E) & mex(to, to) Almin(p) = max (lp, t) ensuring discretares saturates at the planch scale but becomes arbitrarily time for high momentum states Reality is a countable set of snap events top, forming the projection of world-surfaces to CM onto R13, schedul by a discrete least-action principle weighted by an activation fundamental probability complitudes given by eight This is a single generally a mathematical objects Classical M. y.M gravitz Relativing Next: Symnetry invarience, conservation Addiration field Quantum Structure. Spin Statistics, Gauge forces Continuum limits Cousaby-Thernodynames lder tifiability and underdeterminate Convete Culculation tali findity The Ontological view Another way to view the universe is through the lens of string Suppose every fundamental particle part of the standard model could be represented by a 1-d string This string vibrates at a frequency in a vector space to create unique pourticles But lets go one step further Assume the string can be represented by a straight line R= [0,1] And on this string exist a set of countable finite points spaced apart equally (call it IP) n finite points On each point lies a particle that represents a bit state 1,0. I being related to either up or existence O being related to eith down or non-existence The series of O's and I's creates a finite subset Wi in UICIP. Each series represents a function fi defined by which porticles are up or down and in which order The "value" of each soils has the potential to influence the states by other series This creates feed back systems that influences the function/ Vibration of the string which creates the particle Now, one can assume or not that these finite particles could be the 3-p zeros of the manifold IRM currich could/ could-nob) be a continuous vector space. A third view is to assume that time is the universes up dating method. Neitre the part, nor the future exist. Only the present does, and the state of the present is determined by the existence and state of fundamental functions You can view the universe through an epistemological or ontological paspective when 16 comes to its mathematical interpretation It isn't will be assume that either one is correct or incorrect as both allow us to we frameworks that are unique and lead to subsequent discovenss. And each discovery could state that the universe is ontological or epistenological.