Ontological Model of Reality

Anders Lindman 2021

Abstract

This paper presents an ontological model of reality (OM) based on time as a single category of being. The basis for the model is a zero time delay as an initial node for an expanding complete graph starting with a self-loop. A geometric series formula is introduced for mapping the zero time delay to physical time together with a multiverse tree model that allows physical time to progress in discrete finite steps larger than zero.

Introduction

The Ontological Model of Reality (OM) starts with a single node *T* with the following definition:

> **Definition 1:** The initial node *T* is a zero time delay.

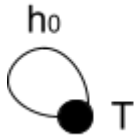
From the initial node *T* a complete graph with self-loops *G* expands according to the following formula (recurrence relation):

Formula 1:

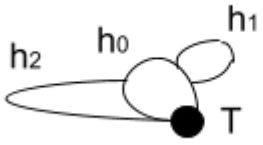
$$g_0 = 1$$
$$g_1 = 2$$
$$g_i = 2g_{i-1} + \sum_{j=0}^{g_{i-1}-2} j,\ i > 1$$

Hypergraph model

The first iteration of the graph *G* is a self-loop and can be represented by an ordinary graph:



However for the further expansion of *G*, a hypergraph is needed with links going from the initial link h_0:



From the hyperlinks h_1 and h_2 new hyperlinks are generated in the next iteration: $h_3 = (h_1, h_1)$, $h_4 = (h_2, h_2)$, $h_5 = (h_1, T)$, $h_6 = (h_1, h_0)$, $h_7 = (h_1, h_2)$, $h_8 = (h_2, T)$, $h_9 = (h_2, h_0)$.

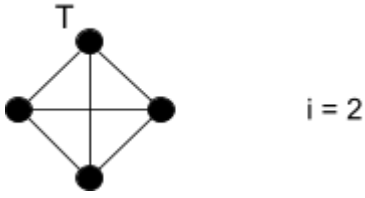
The expansion of G continues endlessly along with *i* getting larger and larger.

Ordinary graph model

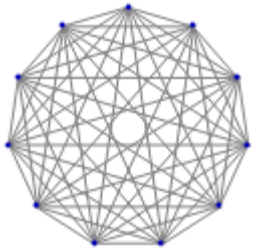
The expanding hypergraph for *G* is in OM alternatively converted to an ordinary complete graph expanding in number of nodes according to *formula 1* by converting the hyperlinks to nodes connected into a complete graph. The ordinary graph *G* is therefore a different and simplified perspective on the model and not the same as the hypergraph *G*.

The initial graph *G* is the single node *T* and in the next iteration (*i* = 1) *G* expands with a self-loop in the hypergraph model that in the ordinary graph model results in a complete graph with two nodes:

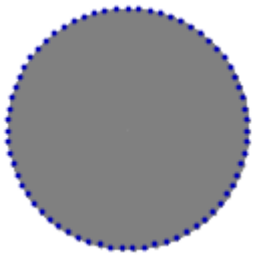
In the next iteration G expands into a complete graph with four nodes:



The next iteration (*i* = 3) results in a complete graph with 11 nodes (according to formula 1):



For $i = 4$, G has 67 nodes:



The number of nodes in G expands explosively:

i = 0	1
i = 1	2
i = 2	4
i = 3	11
i = 4	67
i = 5	2279
i = 6	2598061
i = 7	3374961778892

Reality as a subgraph

In OM our experienced reality is an evolving subgraph R of G. Since G is a complete graph all possible subgraphs are possible, including R that represents our physical reality, with the restriction that R can only take sizes that fit into the expansion of G. This makes OM in theory falsifiable if it can be shown that the foundation of our physical reality expands or behaves in a way that is incompatible with the iterations of G.

Physical time

The zero delay *T* is a platonic form, a timeless principle. Since the time delay is zero the expansion of *G* has infinite “speed” yet the expansion is endless since there is no largest iteration *i*.

Because *T* is a platonic form, physical time is generated in the present moment. This means that in OM physical time began now. And all the past exists as the subgraph *R*, changeless when seen as a snapshot in time (*i* having a defined value) and evolving along with the expansion of the complete graph *G*.

In order to map the evolution of *R* into physical time, a minimal discrete time unit *t*, e.g. Planck time, is introduced. Let *N* represent the current iteration of *G*, B_j the value of *i* at the beginning of our universe, B_{j+1} the value of *i* for the beginning of the next level in the multiverse tree and then *t* is defined by the following formula:

Formula 2:

$$t = \sum_{i=B_j}^{B_{j+1}} C^{-(i - B_j + 1)}$$

Where *C* in *formula 2* is a constant larger than 1 that determines the value of *t*. The rationale for *formula 2* is to give *t* a constant value despite *N* growing infinitely fast.

The time constant *t* only defines one discrete step of physical time. In order to allow physical time as an endless sequence of discrete steps of *t*, OM uses a multiverse tree model in which our universe is just one branch, e.g. a white hole of a black hole in a parent universe.

At each new level in the multiverse tree the time constant *t* is the same within each universe yet seen from the whole multiverse tree, for each new level, *t* requires exponentially more iterations of G. For example in our universe *t* requires an exponential factor less iterations than in the next level of the multiverse tree (e.g. inside black holes in our universe). And in the level after that again the same exponential factor more iterations are required to produce the time constant *t* on that level, and so on indefinitely.

Let *A* be the age of our universe in physical time. Then the number of discrete time steps for *A* is *D* = *A/t* where *D* is the number of levels in the multiverse tree further in the multiverse tree from the level of our universe. This means that in OM each new step of physical time *t* requires an entirely new level of the multiverse tree to be generated. The number of iterations of *N* in *G* increases infinitely fast while being able to produce a steady progress of physical time in discrete steps of *t*.

Formula 3 defines D in terms of the level of our universe L_B and L_N which is the total number of current levels in the multiverse tree.

Formula 3:

$$D = L_N - L_B$$