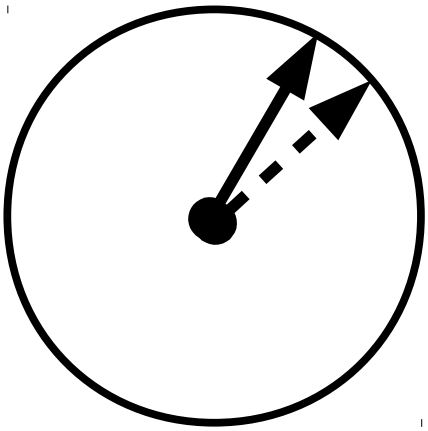
# Avatar Time Lines

by Sven Nilsen, 2020

*In this paper I present an idea of two time lines, closely connected, in a such way that states in one time line corresponds to change of time in the other time line and vice versa. These are called "avatar time lines". This generalizes ordinary time using the intuition of "avatars" from Avatar Graphs. I also show that motion in sub-time lines of all avatar time lines have unitary symmetric paths.*

To measure time, one can use a clock. The arms on the clock shows the state of the time. However, no clock can show the exact state of time, due to the arms need time to move from one state to another. If this movement is perceptible, then the observer knows that the clock is not showing the exact state of time. If the movement is inperceptible, then the observer knows the exact state of time is uncertain.

Arms on a clock shows the state of time, by dividing the circle into labeled positions.

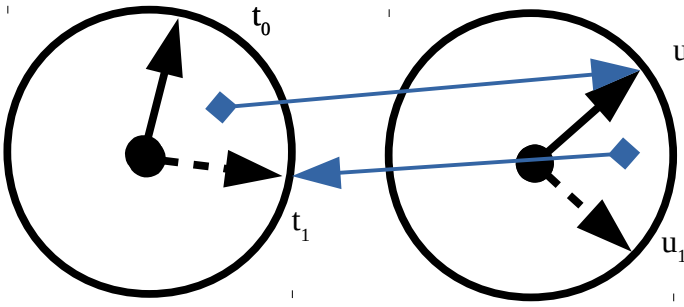


The arm on the clock moves from one state to another, which takes time. This is a self-similar problem, which means one can reduce it but not get rid of it entirely.

Either way, the observer can not know the exact state of time. This is a self-similar problem, which means that adding more arms to the clock can reduce the problem but not get rid of it entirely.

An avatar time line is a generalization of ordinary time lines that mathematically gets rid of the problem of knowing the exact state of time, entirely, instead of merely reducing the problem. Instead of one time line, there are two time lines. The change of time in one time line is the state of time in the other time line. An avatar time line is not possible to experience directly inside our physical universe, because the entire state of an avatar time line can not be described at the same time!

Time line T




Time line U

The name “avatar time line” comes from the intuition of Avatar Graphs, where a “core-self” can be extended with self-similar objects called “avatars”. This is done to solve the problem of introspection.

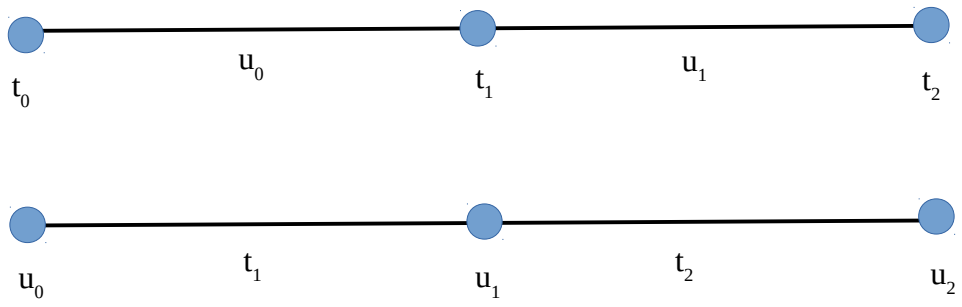
A “core-self” can not introspect itself, because there are no relations to introspect. However, by creating “avatars”, which behaves like itself, processing information under different roles, one can integrate information using multiple levels of extensions and achieve some introspection.

The key to understand n-avatars is that they integrate information between lower-level avatars.

A clock is a 1-avatar of time, because it shows the state of time, without “being” time itself. The illustration on previous page shows a “clock 2-avatar of time”, because it integrates information between two clocks that shows the time in two different time lines.

The “physical reality” that integrates information between the two different time lines is a a 2-avatar of time. An ordinary time line is thought of as a 1-avatar of time, because one reasons about time within the language of clocks and it is not possible to know what “time itself” is.

There is a better way of drawing an avatar time line:




The change of time from `$t_0$` to `$t_1$` can be thought of as a function `$u_0$` such that `$u_0(t_0) = t_1$`.
The change of time from `$u_0$` to `$u_1$` can be thought of as a function `$t_1$` such that `$t_1(u_0) = u_1$`.

A similar pattern that many people are familiar with: The intuition programmers have about computer programs, is that information “moves” from one function to another function, getting transformed along the way. Naturally, one can think about objects as arrows between functions (processing units). However, in Category Theory, it is common to draw functions as arrows between objects instead!

An avatar time line can transform objects into functions and functions into objects, in a symmetric way. All laws that hold naturally for one time line can be transformed into laws for the other time line.

One such law is that when you record a movie and play it backward, you can stop at any time and the frozen frame in time will look exactly as it does when the movie is played forward. Only the motion between frames is reversed. The objects are kept static and functions are reversed.

When in an avatar time line, the other time line keeps functions static and reverses objects!
As a consequence, motion in sub-time line of an avatar time line has a unitary symmetric path:

$f[g] <=> f^{-1}$ The only way to keep a function static: Some symmetric path is the inverse