A Mathematical Definition of the Present and its Duration

Let τ be a real variable that runs from a selected system's future into its present and then into its past a la McTaggart's A-series. We may define a unit of becoming, e, that coordinatizes τ the way seconds coordinatize McTaggart's B-series earlier-times to later-times (e is not the electric charge in this context). By convention we will suppose that $\tau > 0$ means the (A-series) time is in the selected system's future, $\tau = 0$ is its present, and $\tau < 0$ its past.

One doesn't need to make the sizable assumption the present is a single infinitesimally small point centered at, for example, $\tau = 0$. (It may be the smallest duration is the Planck time anyway.) Define for each τ a 'degree presentness' $p = p(\tau)$, so the present may be spread out in A-series time somewhat. (Smith, 2010). By convention we will suppose $p(\tau) =1$ means that τ is fully present, $p(\tau) = 0$ means that τ is fully not present (thus either in the future or the past of the selected system), and $0 < p(\tau) < 1$ means that τ is partially part of the present.

One may consider symmetric functions p, asymmetric functions p, step functions p, infinite-tailed functions p, normalized functions, etc. It would be philosophically dubious to have a disconnected function p.

The block-world theorist would have $p(\tau) = 1$ for all τ. The growing-block theorist would have $p(\tau) = 1$ for $\tau \leq 0$. The presentist (like me) would suppose τ is at least partially present where $p(\tau) > 0$ (i.e. on the support of p).

Suppose for the sake of argument that an A-series is associated with each physical system the way qualia are associated with each physical system in Panpsychism. Then it may be that one system has a presentism function $p(\tau)$ whereas a different system has a different presentism function $p'(\tau')$.

If for two systems $p(\tau)$ and $p'(\tau')$ are non-point-like then there would be some uncertainty as where in the present τ'' an event or process is if these two systems come to have the same A-series. So there would seem to be some kind of uncertainty relation here.

For each selected system there are five not four variables, τ the A-series, t the B-series, and the three space dimensions x^a for a = 1, 2, 3.

References

forthcoming