Time: A Cluster of Perspectival Facts?

Lucy James

University of Bristol

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Outline

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I give an analysis of the methodology employed by Callender in his arguments for TIP, then present two counterexamples to show that the same basic principles actually lead to something more like TAP.

Background Assumptions

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- The best systems are those that best balance the theoretical virtues of strength and simplicity.
- Simplicity aside, we can think of strength as *informativeness*.
- Informativeness: a system's ability to generate the most pieces of the domain given fewest inputs.

Well Posed Cauchy Problems

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- Well posed Cauchy problems are defined so as to meet these three criteria.

Hyperbolic PDEs

A general linear second order PDE:

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- **Characteristics** of a PDE are surfaces or hypersurfaces $\xi(x_1, ..., x_m) = c$, for constant c, where ξ is a solution of

$$\sum_{i,k} \frac{\partial \xi}{\partial x_i} \frac{\partial \xi}{\partial x_k} = 0.$$

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- Could there also be alternative *human* perspectives where the maximally informative directions do not align with those of well posed Cauchy problems?
- Is Callender correct to define time in this way?

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- There are many physical phenomena which are not amenable to being modelled using Cauchy problems.

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- The informativeness of Cauchy problems depends what we wish to be informed about.

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$$\frac{dX}{d\tau} = -\sigma X + \sigma Y,$$
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where $X \propto$ intensity of convective motion, $Y \propto$ temperature difference between ascending and descending currents, $Z \propto$ deviation of vertical temperature from from linearity, r, σ and b are constants, and τ is a time parameter.

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- There are also many physical systems of interest whose dynamics are not 'well-behaved', where Cauchy problems give wildly inaccurate information in temporal directions, and so different techniques must be used to give approximations to the information we seek in temporal directions.
- The connection between time and informativeness tells us more about the aims of science than it does about the workings of the physical world. We *want* information about the temporal future, but we often struggle to find it.

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   - Physical scales represent possible agentive perspectives.

Closing Thoughts: Perspectival Realism?

- Perspectival realism of Giere and Massimi is trivially true: all facts can be relativised to some perspective or other.
- More interesting work is to think about what characterises the specific perspectives to which a given fact is relative.
- Physically relevant perspectives need not have much to do with human phenomenology or agency.