

The Semantic View of Theories as a Metaphysical Thesis

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Every body perseveres in its state of being at rest or of moving uniformly straight forward except insofar as it is compelled to change its state by forces impressed . . . A change in motion is proportional to the motive force impressed and takes place along the straight line in which that force is impressed . . . the common center of gravity of two or more bodies does not change its state whether of motion or of rest as a result of the actions of the bodies upon one another. (from Principia Mathematica)

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A model of N -particle Newtonian mechanics is specified by:

- 1. A list of N positive real numbers m_1, \dots, m_N , representing the particle masses;*
- 2. A list of $N(N - 1)$ smooth potential functions $V_{nm} : \text{Re}^3 \times \text{Re}^3 \rightarrow \text{Re}$ representing the 2-particle potential between the pairs of particles and satisfying $V_{nm} = V_{mn}$;*
- 3. A collection of N smooth functions $x_n : \text{Re} \rightarrow \text{Re}^3$ satisfying the differential equations*

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 - ▶ AdS/CFT

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- ▶ Again, the semantic version is much more permissive

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- ▶ On the semantic conception, cached out in terms of representation (and there are usually rather richer resources to understand approximate instantiation)
- ▶ On the semantic conception, somewhat more *natural* to think of theory-world relation as local (“this system is represented on this length scale by this model” vs “this model represents *the world*”)

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- ▶ The theory-world relation is truth and reference

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- ▶ Close relationship between our (ideal) completed physics and the true metaphysical theory
- ▶ Natural continuity between the methods of science and metaphysics: resolve underdetermination by considerations of simplicity, naturalness, ...

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 - ▶ (another form of) epistemic structuralism: believe our science captures the structure, Kantian humility about the metaphysics beyond that

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- ▶ The theory-world relation is representation
- ▶ Again, close continuity between our ideal-completed physics and our metaphysical theory