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methods of causal inference and scientific representation

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Universidad Complutense de Madrid 17 December 2011

International Workshop Probability and Statistics in Physics

Programme

- 9:00 10:00 Janneke van Lith (Utrecht University) How to Derive the Second Law from Internal Dynamics alone Chair: Fernanda Samaniego
- 10:00 11:00 Orly Shenker (Hebrew University Jerusalem) Objective Probability in Classical Physics Chair: Pedro Sánchez
- 11:00 11:30 *Coffee break*
- 11:30 12:30 Mauricio Suárez (Complutense University Madrid) *Propensities and Pragmatism* Chair: Carl Hoefer
- 12:30 13:30 Meir Hemmo (University of Haifa) Probability in Bohmian Mechanics Chair: Iñaki San Pedro
- 13:30 15:00 Lunch
- 15:00 16:00 Round Table Discussion Probability and Statistics in Physics
- Venue: Seminario S217 Facultad de Filosofía, Edificio A Universidad Complutense de Madrid

Janneke van Lith

How to Derive the Second Law from Internal Dynamics alone

Gibbsian statistical mechanics faces the problem that its fine-grained entropy function stays constant under the Hamiltonian equations of motion, making it problematic to account for the second law of thermodynamics. The coarse-graining approach and interventionism are well-known proposals to tackle this problem. I will argue for an alternative approach, and show that it stays in an important respect closer to thermodynamics. Also, I will address the question to what extent reduction of thermodynamics to statistical mechanics is desirable. Notes

International Workshop: Probability and Statistics in Physics

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Mauricio Suárez

Propensities and Pragmatism

Most propensity theories of probability presuppose what I call the identity thesis, according to which propensities are probabilities (under a suitable interpretation of Kolmogorov's axioms). I argue that the identity thesis is not a requirement on propensities per se and urge a return to Charles Peirce's original insights on probabilistic dispositions instead. I defend this 'pragmatist' conception of propensities against a number of objections, including Humphrey's paradox.



Meir Hemmo

Probability in Bohmian Mechanics

Bohmian mechanics is deterministic, but due to its built-in ignorance about the position of particles it recovers the probabilistic predictions of standard quantum mechanics by assuming a probability distribution (proportional to psi squared) over these positions. However, there is one significant difference in the structure of the probability statements in Bohmian mechanics and in standard quantum mechanics which is the topic of this talk.



Orly Shenker

Objective Probability in Classical Physics

In the deterministic theory of classical mechanics probability expresses ignorance with respect to the initial conditions and possibly the details of the dynamics. On the other hand, phenomena such as the thermodynamic regularities —which presumably supervene on the mechanical structure of the world— obey probabilistic regularities that seem to be objective: whether or not a gas is likely to expands in a container, for example, doesn't seem to depend on anyone knowing anything about that gas. How can this fact be reconciled with the notion of probability as ignorance? How can probability in statistical mechanics be made objective? These questions will be addressed in this talk.

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