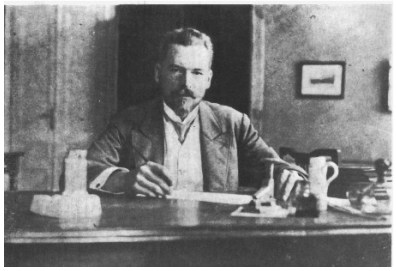

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Ensemble dependence of information-theoretic contributions to the entropy production

Tuesday, 26 September 2023 12:05 (25 minutes)

The entropy production of an open system coupled to a reservoir initialized in a canonical state can be expressed as a sum of two microscopic information-theoretic contributions: the system-bath mutual information and the relative entropy measuring the displacement of the environment from equilibrium. We investigate whether this result can be generalized to situations where the reservoir is initialized in a microcanonical or in a certain pure state (e.g., an eigenstate of a nonintegrable system), such that the reduced dynamics and thermodynamics of the system are the same as for the thermal bath. We show that while in such a case the entropy production can still be expressed as a sum of the mutual information between the system and the bath and a properly redefined displacement term, the relative weight of those contributions depends on the initial state of the reservoir. In other words, different statistical ensembles for the environment predicting the same reduced dynamics for the system give rise to the same total entropy production but to different information-theoretic contributions to the entropy production.

References

[1] K. Ptaszyński, M. Esposito, Phys. Rev. E 107, L052102 (2023)

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