

information thermodynamics on causal pdf

Information Thermodynamics on Causal Networks Sosuke Ito¹ and Takahiro Sagawa² ... Characterizing nonequilibrium dynamics by causal networks (i.e., Bayesian networks), we obtain novel generalizations of the second law of thermodynamics and ... tween information and thermodynamics has been studied in several simple setups with the demon [15–53 ...

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Information Thermodynamics on Causal Networks FSPIP 2013, July 12 2013. ... Causal networks are a probabilistic graphical model that represents ... mutual information using these networks (DAG). [H. Touchette, S. Lloyd, X. Physica A, 2004] In this case, we call that are parents of .

Information Thermodynamics on Causal Networks

Characterizing nonequilibrium dynamics by causal networks (i.e., Bayesian networks), we obtain novel generalizations of the second law of thermodynamics and the fluctuation theorem, which include an informational quantity characterized by the topology of the causal network.

[1306.2756] Information Thermodynamics on Causal Networks

thermodynamics is only applicable to simple information processing that mainly consists of measurement and feedback control between only two systems (i.e., the engine and the demon). In this talk, I will discuss a much more general theory of thermodynamics of information processing: information thermodynamics on causal networks [6].

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Unified framework of information thermodynamics
Fluctuation theorem for information exchanges
Generalization to causal networks
Entropy transfer (information flow) is crucial
Toward application to signal transduction
Thank you for your attention!
S. Ito & T. Sagawa, arXiv:1406.5810. S. Ito & T. Sagawa, PRL 111, 180603 (2013).

Information Thermodynamics on Causal Networks

62 6 Information Thermodynamics on Causal Networks with $k > 2$. The former assumption indicates that the time evolution of the target system X is characterized by the sequence of edges $x_1 \rightarrow x_2 \rightarrow \dots \rightarrow x_N$. The latter assumption corresponds to the Markov property of the physical dynamics.

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