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Information structures and their cohomology. (English) Zbl 07250000

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The principal objective in this paper is to develop a new viewpoint of identifying *entropy* with a topological invariant of a finite statistical system, complementing a previous one by *P. Baudot* and *D. Bennequin* [“The homological nature of entropy”, *Entropy* 17, No. 5, 3253–3318 (2015; [doi:10.3390/e17053253](https://doi.org/10.3390/e17053253))]. The paper introduces a new definition of *information structures* (categories of observables) and cohomological invariants associated to certain presheaves on them after the framework developed by *M. Artin* et al. [Séminaire de géométrie algébrique du Bois-Marie 1963–1964. Théorie des topos et cohomologie étale des schémas. (SGA 4). Un séminaire dirigé par M. Artin, A. Grothendieck, J. L. Verdier. Avec la collaboration de N. Bourbaki, P. Deligne, B. Saint-Donat. Tome 1: Théorie des topos. Exposés I à IV. 2e éd. Berlin-Heidelberg-New York: Springer-Verlag (1972; [Zbl 0234.00007](https://zbmath.org/journals/S000368177200007)); Séminaire de géométrie algébrique du Bois-Marie 1963–1964. Théorie des topos et cohomologie étale des schémas (SGA 4). Un séminaire dirigé par M. Artin, A. Grothendieck, J. L. Verdier. Avec la collaboration de N. Bourbaki, P. Deligne, B. Saint-Donat. Tome 2. Exposés V à VIII. Berlin-Heidelberg-New York: Springer-Verlag (1972; [Zbl 0237.00012](https://zbmath.org/journals/S000368177200012))], in which toposes were introduced as a general foundation of topology allowing a unified study of several cohomological invariants with respect to groups, topological spaces and schemes.

Reviewer: [Hirokazu Nishimura \(Tsukuba\)](#)

MSC:

- [55N35](#) Other homology theories in algebraic topology
- [94A15](#) Information theory (general)
- [39B05](#) General theory of functional equations and inequalities
- [60A99](#) Foundations of probability theory

Keywords:

[information cohomology](#); [entropy](#); [nonextensive statistics](#); [information structures](#); [sheaves](#); [topos](#)

Full Text: [Link](#)

References:

- [1] [arXiv:1303.3255](#).

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