ENTROPY AND ADIABATIC ACCESSIBILITY

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ABSTRACT

In 1856 Rudolf Clausius coined the word entropy as a suitable name for what he had been calling the 'transformational content of a body'.

The new word made it possible to state the second law of thermodynamics in the brief but alarming form: The entropy of the universe tends toward a maximum. Thus, entropy is originally related to possible changes, not to chaos and probability as in subsequent work by Boltzmann and Gibbs.

In my contribution to the mini-symposium a modern version of this view on entropy, developed in joint work with Elliott Lieb already 25 years ago, will be sketched. The key concept is the relation of adiabatic accessibility between pairs of states of macroscopic bodies. It turns out that an essentially unique entropy for equilibrium states emerges from a few basic properties of this relation. The situation is different for non-equilibrium states, however, where as a rule more than one entropy function is required to delimit adiabatic accessibility.

A recent exposé of this work can be found in [1].

REFERENCES

[1] J. Yngvason, *A direct Road to Entropy and the Second Law of Thermodynamics*, In: The Physics and Mathematicas of Elliott Lieb, Vol. II, Rupert L. Frank, Ari Laptev, Mathieu Lewin, Robert Seiringer (eds.), pp. 565–584 EMS Publishing House 2022, arXiv:2202.07982.