Review of: "Infodynamics, Information Entropy and the Second Law of Thermodynamics"

Angel Cuadras[1]

1 Universidad Politécnica de Cataluna

Potential competing interests: No potential competing interests to declare.

Review of the manuscript ":Infodynamics, Information Entropy and the Second Law of Thermodynamics"

Certainly, information and entropy present difficulties in the literature, and the author aims to bring some light to this topic. I agree with the author's last sentence, "Much work remains to be done," which agrees with Jaynes' affirmation in the "theory of probability" that there is a lot of work done on entropy but nobody knows what to do with it.

However, the manuscript is poorly written, references are not well selected (I would even say that some of them should be avoided, but this could be a too personal opinion), and the basis on statistical physics and Shannon information theory is missing. Even irreversible thermodynamics and maximum entropy principles are not considered.

There are several expressions that should be reconsidered:

"Thermodynamic Entropy is energy that is not available to produce useful work, and is evidenced as heat." This is not true. Entropy is not the same as energy or heat. If heat and entropy were the same, one concept would not be necessary. Thermodynamic entropy describes energy degradation, but not energy itself.

Ref 6. Who is the author? The text and reference have different names. Check reference numeration.

"Energy and information is not the same." I cannot understand this affirmation. I am from the field of electronics. Imagine a piezoelectric material. You detect small vibrations as a sensor and you convert them to information. However, you increase the magnitude of the vibrations, and you store the energy. The first case is a sensor, the second case is an energy harvester. The only difference is the human approach to it, but physically, it is the same process. A similar approach can be considered for the definition of noise. Depending on the research approach, the same mechanism can be considered as noise (signal transmission) or as a system's state indicator (electrochemical noise analysis).

"Despite the fact that the Second Law of Thermodynamics applies to changes in energy and heat, thus the descriptor Thermodynamics, it is often used when referring to information dynamics, assuming that information and energy may be lost in irreversible processes. This, however, is not true ." The use of self-reference is not appropriate.

In statistical physics books, it is easy to find the similarity between Shannon entropy and thermodynamic entropy. The interpretation may still be unclear somehow, but the mathematical identification is clear.

With respect to Landauer's comment, to store information, you need energy. The amount of energy you need will be machine dependent, but no ideal case is possible either.

The discussion theory is very strange. It is not related to the previous formulation, but to some vague examples.

I would not recommend the publication of this manuscript in its present form. I cannot find any improvement in the field, but to me it introduces more confusion.