

Some reading notes on “Jean-Louis Koszul and the elementary structures of information geometry”

The history of science divides into two parts: (a) personal anecdotes, more or less mythical, that tell about the gene pool of great scientists, and about their exceptional characters; and (b) the history of ideas, which shows the complex and multi-faceted evolution of ideas, from the state of intuition, to the state of developed theories.

..Obviously, to the working scientist, it is part (b) which is most important, and indeed an invaluable resource for new inspiration and perspective. Writing about the history of ideas requires special rigor, from the author. It is often said that scientists write about the history of their field “as it should have been”, from their point of view.

The current contribution strikes an excellent balance between the two parts (a) and (b). We get interesting details about Koszul, his family connections, his personal and mathematical life, but these details serve to put into perspective his scientific work. This is a great feature of the present contribution. Its other excellent feature is a fast-paced, and intuitive introduction to Hessian geometry and its relation to homogeneous cone geometry. These are very specialized topics, and the author does a great job of summarizing and explaining them.

While I highly rate this contribution, I would like to ask the author, as much as possible, to have it proof-read by a native English speaker.

Here are some notes, which I made while reading, as they arose in the text:

- 1) “in this article we go tribute” → pay tribute
- 2) “Koszul work” → Koszul's work
- 3) “basic contributions” → fundamental (basic, and elementary, mean easy. In particular, the use of “elementary” in the title is confusing to many readers)
- 4) “strong of” → building on
- 5) Why is Elie Cartan the master of Koszul. Did they interact, or work together? I understand Elie Cartan's contribution was a major inspiration to Koszul, but “master” involves some form of guidance or mentoring.
- 6) “linked in the proceedings” → do you mean quoted, cited ?

7) When citing an extended paragraph from a French source, I believe it is better to keep it in French, instead of translating to English.

8) “in the Dmitri Alekseevsky” → in Dmitri Alekseevsky's

9) “from abroad to Strasbourg, in Grenoble.” : is the mention of Grenoble correct ?

10) “checking the equations of Codazzi” → which verifies the Codazzi equation.

11) “the connection of Levi-Civita” → the Levi-Civita connection

12) “and a symmetric bilinear form $\gamma = D \alpha$ ” → the following sentence begins with a mathematical symbol, α . This is confusing (with the point, this looks like multiplication). In general rule, a sentence should never begin with a math symbol.

13) “In the case of a homogeneous regular convex cone” → perhaps it is better to say that D is the canonical flat connection of the ambient vector space. As it stands, D is not specified, for this case.

14) “Vinberg have introduced an affinely-invariant” → technically, it is invariant by the group of linear automorphisms of the cone. Why is it affinely-invariant?

15) in general, please pay attention not to confuse "simple" and "semi-simple".