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50(ish) years of Fuzzy Logic in Europe In memory of Lotfi Asker Zadeh

Editorial

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50 and counting in Europe

The original idea of this special issue was to remember the important date of the 50 years elapsed from the publication of the 1965 Lotfi's seminal paper. Some occasional technical problems delayed the publication, but we must confess that these problems could have been solved, since almost all the papers were ready; what perhaps did not push the editors from trying to respect the date on the spot was a certain attitude to play with the idea that also the deadline could be respected fuzzily. And, anyway, we wish to recall once more that Lotfi used the term for the first time - in published form - in the beautiful 1962 paper which, for the acuteness of many of his epistemological comments, is still valuable today not only for historical reasons.

> «There are some who feel that this gap [the one between animate and inanimate Systems] reflects the fundamental inadequacy of the conventional mathematics – the mathematics of precisely-defined points, functions, sets, probability measures, etc. – for coping with the analysis of biological systems, and that to deal effectively with such systems, which are generally orders of magnitude more complex than manmade systems, we need a radically different kind of mathematics, the mathematics of fuzzy or cloudy quantities which are not describable in terms of probability distributions. Indeed,



Figure 1: Lotfi Zadeh in the late 1950s as instructor at Columbia University in New York (photo: Lotfi Zadeh Archive by Rudolf Seising).

> the need for such mathematics is becoming increasingly apparent even in the realm of inanimate systems, for in most practical cases the a priori data as well as the criteria by which the performance of a man-made system is judged are far from being precisely specified or having accurately-known probability distributions.» [1]

So, paradoxically, to respect "fuzzily" the 50th year of Information Control Paper, would correspond to respecting crisply the 55th year of the first appearance of the term *fuzzy*. We thought that all these unusual circumstances, coincidences (and scattered comments) could have enjoyed Lotfi. Now we are profoundly sad that our delay has impeded him to see what we had prepared in his (and his ideas) honour. We cannot, then, but present these pages also in his memory.

And, for doing this, let us add something. As the same Lotfi has stressed in many occasions, the crucial point of his innovative ideas is to consider that the change of perspective would at the same time force us to think anew to many questions - both (apparently) settled and (completely) unsettled.

[1] From Circuit Theory to System Theory, Proceedings of the IRE, May 1962, 50, p.857

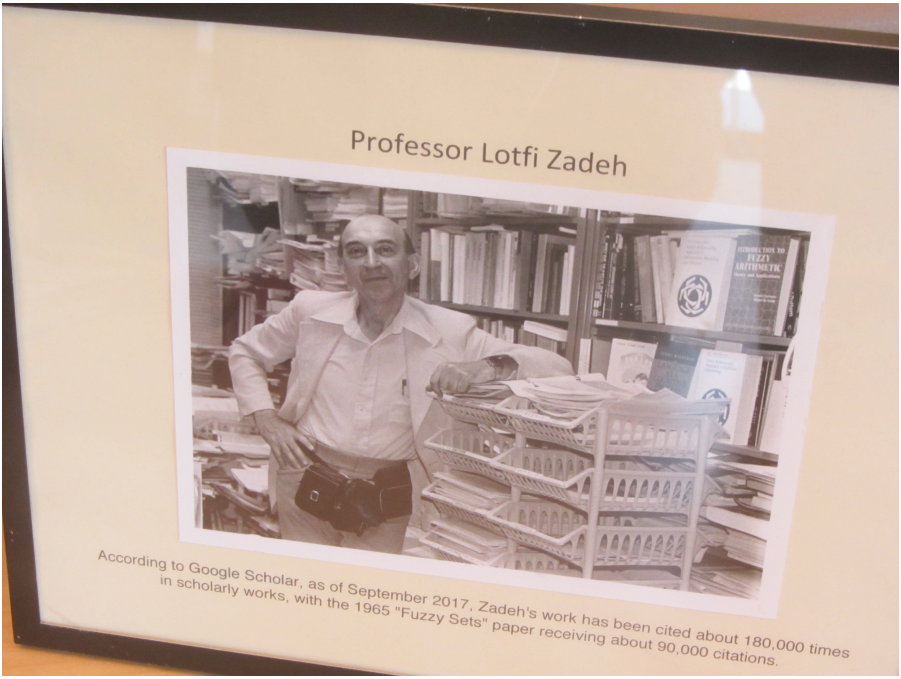


Figure 2: Lotfi Zadeh in his office at UC Berkeley, Evans Hall, in the late 1980s (photo taken at the Commemoration ceremony for Lotfi A. Zadeh, Wozniak Hall, EECS Dept. UC Berkeley, September 8, 2017; Lotfi Zadeh Archive by Rudolf Seising).

> «I would like to stress that there is much more to Fuzzy Logic than multi-valuedness of truth.»

he answered to a question in a 1995 interview and, to another question regarding why he was «down to earth» in his own approach to solving problems, his reply was:

> «I've been conscious for a very long time that the real world is very complex. There's always a tendency to oversimplify.»[2]

So, by remembering him, in this moment of sadness, what we want to stress is not only the import of his specific contributions but his crucial, general, suggestions. The world is very complex. We have the tendency to simplify. In some cases the simplification helps, in many other cases simplification impedes

[2] *http : //www.azer.com/aiweb/categories/magazine/24_folder/24_articles/24_fuzzylogic.html*



Figure 3: Lotfi Zadeh in his office at UC Berkeley, Soda Hall, August 2011 (photo by Rudolf Seising).

to see things as they are. Approximation is an essential aspect of the way in which we approach and know the world, a very complex world. Substantially, this is the essence of fuzziness. By taking it into account we can understand better many things and, simplifying our models, extend the range of what we can understand. We desire to afford an extreme tribute to Lotfi Asker Zadeh, by stressing the importance of these methodological lessons.