DEPARTAMENTO DE
ESTADÍSTICA E I.O.

GOBIERNO DE ESPAÑA
MINISTERIO DE EDUCACIÓN

Instituto de Matemática Interdisciplinar

Seminario de Estadística e I.O.

Rudolf Seising

Visiting Researcher at the European Centre for Soft Computing, Mieres, Asturias (Spain)
College lecturer in the faculty of History and Arts, Institute of History of Sciences
Ludwig-Maximilians-University Munich (Germany)

"Historical Epistemology from a Fuzzy Point of View"

In science we have a traditional division of work: on the one hand we have fundamental, logical and theoretical investigations and on the other hand we have experimental and application side examinations. The theoretical work in science is using logics and mathematics to formulate axioms and laws. It is linked with the philosophical view of rationalism whereas the other aspects of science using experiments to find or prove or refute natural laws have their roots in the philosophical empiricism.

In both directions – from experimental results to theoretical laws or from theoretical laws to experimental proves or refutations – scientists have to bridge the gap that separates theory and practice in science.

This epistemological dispute is of great interest for historians of science but it is ongoing till this day and therefore it is of great interest for today's philosophers of science, too. Searching a bridge over the gap between rationalism and empiricism is a slow-burning stove in the history of philosophy of science. Lotfi Zadeh's hierarchy stack of methodologies, fuzzy sets and systems (FSS), computing with words (CW) and the computational theory of perception (CTP), is recommended to build a bridge over this gap.

We will examine this methodology stack for bridging the gap between real and theoretical systems from an epistemological point of view. Also, the approach dubbed the "structuralist view of scientific theories" in the 20th century will be extended and enhanced by the concepts of "fuzzy sets" and "fuzzy relations" to model perceptions of scientific observers. This approach provides a new view of the "fuzzy" relationship between empiricism and theory. To illustrate the results of this "fuzzy structuralist" theory in the philosophy of science, three case studies – medical diagnosis, and evolutionary biology, and information theory – will be discussed.

In the last decade the historian of science and molecular biologist Hans-Jörg Rheinberger presented a new approach to philosophy of science, "historical epistemology", that deals with the concept of so-called "epistemic things" - "fluctuating objects", "imprecise concepts" – as he also called them in his historical work. "As long as objects are in flux" he stressed, "the corresponding concepts must remain in flux, too."

Regarding the historical development of such concepts we accentuate the value of imprecision, vagueness or fuzziness in science.

Organizado por el Departamento de Estadística e I.O. de la UCM y el IMI.

Fecha: 24 de junio de 2009, a las 13.00 horas

Seminario Sixto Ríos (aula 215), Dpto. de Estadística e I.O.
Facultad de CC Matemáticas, UCM.