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ACCESSIBLE CATEGORIES AND MODEL THEORY

Session 18A

Congress section(s): A1

Accessible categories were introduced by M. Makkai and R. Paré as a framework for infinitary model theory. They have turned out to be important in algebra, homotopy theory, higher category theory and theoretical computer science.
I will survey their conections with abstract elementary classes and discuss how model theory of abstract elementary classes can be extended to that of accessible categories. In particular, I will present a hierarchy beginning with finitely accessible categories and ending with accessible category hsving directed colimits.

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LOGICAL EMPIRICISM IN EXILE. HANS REICHENBACH'S RESEARCH AND TEACHING ACTIVITIES AT ISTANBUL UNIVERSITY (1933–1938)

Session 18L

Congress section(s): B3, B6, B7, C5, C7

The purpose of this paper is to shed new light on a less well-known stage in the development of Hans Reichenbach's thought, namely his research, output and teaching activities at Istanbul University (1933–1938). During his exile in Turkey, Reichenbach was able to continue his efforts to popularize and extend the program of "scientific philosophy," not only through the restructuring of the Department of Philosophy at Istanbul University, but also through different academic exchanges with European countries. Between the beginning and end of Reichenbach's exile in Istanbul, the Turkish reception of logical empiricism and scientific philosophy is characterized by a shift from a mere external interest in these fields to an effective implementation of the principles and methods that characterize Reichenbach's philosophical approach. The aim of this paper will be to show that Reichenbach's impact was not limited to an unilateral transfer of knowledge but that it has led to an active participation of the Turkish side in establishing a link between philosophy and particular scientific disciplines (Einzelwissenschaften) at Istanbul University. Therefore, the consideration of Reichenbach's output between 1933 and 1938 must necessarily be complemented with the study of the courses he gave at Istanbul University as well as the study of the work of his students, most of which were only completed after Reichenbach's departure to the United States. His students' under-researched contribution to the development of this scientific philosophy may seem to have quickly faded away at the philosophy department of Istanbul University, but one hypothesis I will examine is whether its more durable impact did not in fact happen in other fields, for example the development of experimental psychology in the same university.

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EMPIRICAL INVESTIGATION OF THE LIAR PARADOX. HUMAN BRAIN PERCEIVES THE LIAR SENTENCE TO BE FALSE.

Session 5H

Congress section(s): A2, B3, C5

Paradoxes are the unwanted children of philosophy. Whenever a paradoxes are discovered, philosophers immediately start working to identify their cause and make them disappear. For the Liar paradox (commonly formulated as: "This sentence is false"), that work started 2500 years ago and continues to this day. In our work we present an empirical investigation of one of the most popular solutions to this paradox.
In XV-th century Jean Buridan proposed that every sentence in natural language implicitly asserts its own truth (i.e. the virtual entailment principle). Adopting this principle means that the Liar sentence is not paradoxical but false, because its content is contradictory to what is virtually implied. From that, Jean Buridan follows that humans should perceive the Liar sentence the same way as any other false sentence. This solution to the Liar paradox received criticism for making ad hoc claims about natural language. There is no apparent reason to assume that every sentence asserts its own truth, other than to get rid of the paradox. However, thanks to modern advancements in psychophysiology, it became possible to empirically verify if human brain really perceives the Liar sentence like a false sentence.
We designed and conducted an electroencephalographic experiment to examine brain activity during the comprehension of the Liar sentence. We compared it to brain activity during comprehension of true sentences, false sentences and Truthteller sentences ("This sentence is true"). The experiment was conducted according to all the modern standards of neuroimaging. In our paper we minutely describe all the details of experimental procedure, brain activity recording and statistical analysis of the results. Our results show that the human brain processes the Liar sentence identically to false sentences, and that the Truthteller sentence is processed identically to true sentences. This provides evidence for the Buridan's hypothesis and the virtual entailment principle. These results have several implications for contemporary theories of truth and logic.
We demonstrate that it is possible to investigate the inherent "theory of truth" embedded in the human brain and that a theory of truth can have predictive power with regard to physical phenomena. However, we do not demonstrate that the Liar sentence is false. We merely demonstrate that humans perceive the Liar sentence like if it was false. This places our experiment within the relativistic view on truth, where adjectives pertaining to truth-value are assessment-sensitive and an agent is required to perceive them to assess them. Finally, finding empirical evidence for the virtual entailment principle supports the idea that humans think with the logic of truth (a logic for which the truth is a designated value of its adequate semantics). This demonstrates that the conclusions of non-Fregean logics regarding the Liar paradox coincide with human understanding of language.