Methodology of Logic Workshop
Monday 2nd & Tuesday 3rd December, University of Padova

Abstracts

Mathematical and Logical Pluralism (Colin Caret, Utrecht University)

Graham Priest has recently argued in favor of mathematical pluralism but against logical pluralism. This is a surprising package view because Priest's favorite version of mathematical pluralism is largely motivated by the ways in which proofs and theorems vary between classical, intuitionistic, and paraconsistent parts of mathematics. In particular, Priest argues for two claims. The first is that mathematical pluralism does not imply logical pluralism. The second is that this defeats Stewart Shapiro's "eclectic" argument for logical pluralism, which is supposed to draw its justification from mathematical pluralism.

In this talk, I argue that Priest is wrong about the defeat of eclecticism mostly because he misconstrues the crux of the debate. Priest is absolutely right that mathematical pluralism does not imply logical pluralism, but this is not the boon to logical monism he thinks it is. On closer inspection, it is basically irrelevant. The evidence from mathematical practice primarily shows us that there are a plurality of comprehensive epistemic norms that govern the means of understanding mathematical theories. The question of whether this supports logical pluralism is best construed as an explanatory question: how to explain this diversity in practice? The eclectic argument was always meant to be an inference to the best explanation. With respect to this explanatory question, I argue that Shapiro's view fares much better than Priest's. This has already been suggested in the literature, but here I want to spell this out more carefully. A view that accepts logical pluralism can explain mathematical pluralism in a way that respects the evidential priority of practice better than a view that rejects logical pluralism.

Antidiscrimination Logic (Elena Ficara, University of Paderborn)

My paper revolves around the notion of discrimination and its connection to logic. I have already treated the theme in Ficara 2024, focusing on the contribution of Plumwood 1993. Now I count to further deepen this consideration, and have three main objectives. First, I aim to clarify the concepts of logic and discrimination at the basis of my analysis. Second, I intend to focus on the structures of thought that ground discriminatory practices. Finally, I aim to work towards a notion and practice of logic that could be profitably applied to anti-discriminatory discourses and measures.

How to Follow the Omega-Rule (Andreas Fjellstad, University of Padova)

The infamous omega-rule is extremely practical from a proof-theoretical perspective but extremely problematic from a philosophical perspective. After all, how can we, as finite beings, apply a rule on infinitely many premises?

Whereas the typical criticism against the possibility of following the omega-rule has a top-down flavour, being based on fundamental presumptions from epistemology and metaphysics as opposed to actually consider applications of the rule in practice, this paper presents and analyses two concrete applications of the omega-rule where it suffices to establish by an inductive argument in the meta-theory that a particular recursive function provides an instance for each natural number. The difficulty in following the omega-rule then, reduces to that of proving that there is such an appropriate recursive function.

Unifying Three Conceptions of Logic (Ulf Hlobil, Concordia University)

Compared to other subfield of philosophy, it is rather unclear what the topic of logic is. According to a conception of logic that goes back to Aristotle, logic has to do with acts of reasoning and demonstration. According to an alternative conception of logic that derives from Neo-Platonism, logic studies very general or abstract facts or patterns, which are (for the most part) independent of acts like reasoning or demonstration. And according to a conception that Frege seems to have inherited from the Stoa, the topic of logic are abstract entities that are a lot like the abstract entities that are often taken to be the topic of mathematics, such as numbers, sets, or functions. Which of these conceptions (if any) is correct has important consequences for the epistemology of logic; for they seem to call for very different methodologies. I present a view that unifies all three conceptions of logic. According to this view, logic studies certain (namely those that hold in virtue of logical form) incompatibilities of occurrences of what I call "rational forms." Rational forms occur in the world, thereby making sentences true or false; and rational forms also occur in the mind, where such occurrences constitute acceptances and rejections. Conceived independently of such occurrences, rational forms are abstract entities.

From Vibes to Logic & Back to Practice: The case of variable sharing (Franci Mangraviti, University of Padova)

The so-called *variable sharing property* is the putative formal counterpart of a particular motivating intuition for relevant logics, insisting that an antecedent of a valid conditional must share some content with the consequent. Even within relevantist literature, its status is controversial: some find it central to the very idea of relevance, while others consider it a mere byproduct of more insightful properties. Furthermore, there is much discussion on how variable sharing should be understood beyond propositional languages, and how strongly it should be stated.

In this talk I will go through the recent history of variable sharing, with special attention to the way it has been discussed (and not discussed) in relation to mathematical practice. This will serve as a case study for how logical properties can both be inspired by current extralogical practices, and inspire new ones. In particular, I will show that the descriptive/normative dichotomy put forward in the relevant mathematics literature is ill-suited to capturing the relationship between logic and mathematics.

What are the Formulas of a Logic? (Alex Paseau, University of Oxford)

What actually *are* the well-formed formulas of a logic, such as p or Fx or $\exists y \Box Qy$? My talk will do four things. First, it will describe the standard view, that formulas are symbol types. Second, it will show that the standard view is untenable. Third, it will put forward an alternative, structuralist view. Finally, it will consider what, if anything, changes when we move from the standard to the structuralist view of what the formulas of a formal language are.

Logics of Malicious and Abnormal Behavior in Social Networks (Mina Pedersen, University of Bergen)

This talk concerns agents in multi-agent systems who act out of the ordinary and/or maliciously for their own gain. Analyzing these types of agents can not only give us valuable information about agents' potential power to disrupt, but also about the safety of systems in which they act. Specifically, I will talk about using modal logics for social networks to reason about malicious and abnormal behavior.

I will give an example of such a study where we use a temporal logic to follow a social network as it evolves through time. We see how one can use model checking to detect a particular type of agent, namely the social bot.

The talk is based on my recently defended PhD thesis as well as joint work with Marija Slavkovik and Sonja Smets.

Learning what Others Know (Sonya Smets, University of Amsterdam)

In this presentation I focus on the use of modal logic, in particular on the use of dynamic epistemic logic, for a philosophical analysis of comparative epistemic assertions that capture the epistemic superiority of an individual or a group of agents over other agent(s). Such assertions can express that a group of agents collectively knows everything that another group of agents knows. I present examples of epistemic comparative statements and analyze them in the context of different epistemic conditions. On the dynamic side, I will discuss the type of actions by which an epistemic advantage can be acquired. I will illustrate how this analysis has given rise to

the introduction of a new collective attitude called common distributed knowledge. In the presentation I will show how common distributed knowledge combines features of both common knowledge and distributed knowledge. This presentation is based on joint work with A. Baltag on a philosophical discussion of the results in [1,2].

[1] A. Baltag and S. Smets, Learning what Others Know, in: Kovacs, L. and E. Albert (eds.), LPAR23 proceedings of the International Conference on Logic for Programming AI and Reasoning, EPiC Series in Computing, (2020), Volume 73, pp. 90-110.
[2] A. Baltag and S. Smets, Logics for Data Exchange and Communication, (2024), Proceedings of Advances in Modal Logic, College Publications.

Criteria for Theory Choice in Logic (Erik Stei, Utrecht University)

Standard criteria for theory choice (like, for instance, adequacy to the data, exactness, consistency, fruitfulness, or simplicity) have been invoked by defenders of quite different approaches to the epistemology of logic. Conventionalists, reconstructionists, and anti-exceptionalists all hold that such criteria have a role to play when it comes to assessing logical theories. What seems to differ is the epistemic upshot of those criteria, or the lack thereof. The talk examines different proposals concerning criteria for theory choice in logic and their philosophical underpinnings. A (tentative) thesis to be defended is that theory choice in logic is to be guided by epistemic – and not merely practical – considerations.