CONTRIBUTED TALKS 4
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Venue - PIV

AHMAD KARIMI, Yablo's paradox(es) as theorem(s) in temporal Logic.
Department of Mathematics, Beihang Khatam Alania University of Technology, Beihangan, IRAN.
E-mail: karimi@katu.ac.ir.

This is a joint work with Saeed Salehi.
Paradoxes are interesting puzzles in philosophy and mathematics. They can be more interesting when they turn into genuine theorems. For example, Russell's paradox which collapsed Frege’s foundations of mathematics, is now a classical theorem in set theory, implying that no set of all sets can exist. Or, as another example, the Liar paradox has turned into Tarski’s theorem on the undefinability of truth in sufficiently rich languages. This paradox also appears implicitly in the proof of Gödel’s second incompleteness theorem. For this particular theorem, some other paradoxes such as Berry’s ([1, 2]) or Yablo’s ([7]) have been used to give alternative proofs ([4, 6]). A more recent example is the surprise examination paradox [3] that has turned into a beautiful proof for Gödel’s second incompleteness theorem [5]. In this talk, we transform Yablo’s paradox into a theorem in the Linear Temporal Logic (LTL). This paradox, which is the first one of its kind that supposedly avoids self-referentiality and circularity has been used for proving an old theorem ([4, 6]) but not a new theorem had been made out of it. Here, for the very first time, we use this paradox (actually its argument) for proving some genuine mathematical theorems in LTL. The thought is that we can make progress by thinking of the sentences in the statement of Yablo’s paradox not as an infinite family of atomic propositions but as a single proposition evaluated in lots of worlds in a Kripke model. Thus the derivability of Yablo’s paradox should be the same fact as the theoremhood of a particular formula in the linear temporal logic.

This temporal treatment also unifies other versions of Yablo’s paradox.