

- ALI ENAYAT, *Some recent news about truth theories.*

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For a fragment \mathbf{B} of PA (Peano arithmetic), $\text{CT}^-[\mathbf{B}]$ (compositional truth over \mathbf{B}) is the theory formulated in the language of arithmetic augmented with a fresh predicate $\text{T}(x)$ to express: “ x is the Gödel number of a true arithmetical sentence”. The axioms of $\text{CT}^-[\mathbf{B}]$ consist of the axioms of \mathbf{B} plus finitely many sentences that stipulate that $\text{T}(x)$ is well-behaved on atomic sentences, and obeys Tarski’s familiar compositional clauses guiding the behaviour of the truth predicate. We have known, since the pioneering work of Krajewski, Kotlarski, and Lachlan (1981), that $\text{CT}^-[\text{PA}]$ is conservative over PA. In this talk we will discuss the following recent developments:

- Recent joint work [1] of Pakhomov and the author on the equivalence of $\text{CT}^-[\Delta_0 + \text{Exp}] + \text{DC}$ with $\text{CT}_0[\text{PA}]$, where DC is the axiom stating “a disjunction of finitely many sentences is true iff one of the disjuncts is true”; and $\text{CT}_0[\text{PA}]$ is the result of adding the induction scheme for Δ_0 -formulae that mention the truth predicate to $\text{CT}^-[\text{PA}]$. This result refines earlier work by Kotlarski (1986) and Cieřlinski (2010), and shows that $\text{CT}^-[\text{PA}] + \text{DC}$ is not conservative over PA, since as demonstrated by Wcisło and Lelyk [3], $\text{CT}_0[\text{PA}]$ proves $\text{Con}(\text{PA})$ (and much more).
- Recent joint work [2] of Lelyk, Wcisło, and the author on the *feasible reducibility* of $\text{CT}^-[\text{PA}]$, and certain other canonical untyped truth theories to PA. In particular, this shows that $\text{CT}^-[\text{PA}]$ does not exhibit superpolynomial speed-up over PA, in sharp contrast to the superexponential speed-up of $\text{CT}^-[\mathbf{B}]$ over \mathbf{B} for finitely axiomatizable \mathbf{B} .

[1] Ali Enayat and Fedor Pakhomov, *Truth, disjunction, and induction*, **Archive for Mathematical Logic**, <https://doi.org/10.1007/s00153-018-0657-9> (2019).

[2] Ali Enayat, Mateusz Lelyk, and Bartosz Wcisło, *Truth and feasible reducibility*, to appear in the **Journal of Symbolic Logic**, arXiv:1902.00392 (2019).

[3] Bartosz Wcisło and Mateusz Lelyk, *Notes on bounded induction for the compositional truth predicate*, **The Review of Symbolic Logic**, vol. 10, pp. 455–480 (2017).