

- MARTA GAWEK, AGATA TOMCZYK, *Translation of Sequent Calculus into Natural Deduction for Sentential Calculus with Identity*.

Chair of Logic and Cognitive Science, Institute of Psychology, Adam Mickiewicz University.

*E-mail:* gawek.marta@gmail.com.

*E-mail:* a.tomczyk@protonmail.com.

Suszko's Sentential Logic with Identity (SCI) has many unapparent properties, which have not been studied too closely. One of the properties that makes SCI worthwhile is that even though it contains an intensional identity connective, the logic itself is extensional. So far, proof methods established for SCI are Hilbert-style system, sequent calculi (SC) (introduced by both [1] and [2]), dual-tableau system by [4] and DFC-algorithms by [5]. In our talk we will present a natural deduction (ND) system for SCI, being the result of employing Negri's strategy [3] of translating SC rules into ND. Rephrasing of logical rules of SC into ND is executed by auxiliarily expressing ND rules using notation appropriate to SC. For a given rule of inference  $R_1$  it is done so by replacing every formula  $A$  in ND's derivation by formula  $\Gamma \rightarrow A$ . Then, the arrow stands for derivability relation, and  $\Gamma$  for a set of open assumptions  $A$  depends on. Dischargeable assumptions ( $A^m, B^n$ , and so forth) should be expressed as  $A^m, \Delta \rightarrow C$ . It should be read as:  $\Delta$  being any (possibly empty) context, and  $C$  being the main formula we aim to infer. We will discuss one set of translated rules, which embraces left SCI-rules, as well as admissible rules encompassing transitivity and symmetry. Proofs of soundness and completeness will be discussed as well.

[1] SZYMON CHLEBOWSKI, *Sequent Calculi for SCI*, ***Studia Logica***, vol. 106 (2018), no. 3, pp. 541–563.

[2] AILEEN MICHAELS, *A uniform proof procedure for SCI tautologies*, ***Studia Logica***, vol. 33 (1974), no. 3, pp. 299–310.

[3] SARA NEGRI, JAN VON PLATO, AARNE RANTA, ***Structural Proof Theory***, Cambridge University Press, 2001.

[4] EWA ORŁOWSKA, JOANNA GOLIŃSKA-PILAREK, *Dual Tableau for Propositional Logic with Identity*, ***Dual Tableaux: Foundations, Methodology, Case Studies***, vol 33. (Ewa Orłowska, Joanna Golińska-Pilarek), Springer, Dordrecht, 2011, pp. 417–431.

[5] ANITA WASILEWSKA, *DFC-algorithms for Suszko logic and one-to-one Gentzen type formalizations*, ***Studia Logica***, vol. 43 (1984), no. 4, pp. 395–484.